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# Limnological Monitoring on the Upper Mississippi River System, 1993–1996: Long Term Resource Monitoring Program Havana Field Station

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by

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## Preface

The Long Term Resource Monitoring Program (LTRMP) was authorized under the Water Resources Development Act of 1986 (Public Law 99-662) as an element of the U.S. Army Corps of Engineers' Environmental Management Program. The LTRMP is being implemented by the Upper Midwest Environmental Sciences Center, a U.S. Geological Survey science center, in cooperation with the five Upper Mississippi River System (UMRS) States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The U.S. Army Corps of Engineers provides guidance and has overall Program responsibility. The mode of operation and respective roles of the agencies are outlined in a 1988 Memorandum of Agreement.

The UMRS encompasses the commercially navigable reaches of the Upper Mississippi River, as well as the Illinois River and navigable portions of the Kaskaskia, Black, St. Croix, and Minnesota Rivers. Congress has declared the UMRS to be both a nationally significant ecosystem and a nationally significant commercial navigation system. The mission of the LTRMP is to provide decision makers with information for maintaining the UMRS as a sustainable large river ecosystem given its multiple-use character. The long-term goals of the Program are to understand the system, determine resource trends and effects, develop management alternatives, manage information, and develop useful products.

In this report, limnological monitoring conducted by the Havana (Illinois) Field Station from 1993 through 1996 is summarized. Reports of this type provide a synopsis of the collected data and collection methods, as well as a preliminary report of remarkable or unusual conditions in the system. They are intended to be produced annually.

This report was prepared under Task 2.2.3.6, *Evaluate and Summarize Current Monitoring Results* of the Operating Plan (U.S. Fish and Wildlife Service 1993). This report was developed with funding provided by the Long Term Resource Monitoring Program.

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**Abstract.** Since 1988, the Long Term Resource Monitoring Program (LTRMP) staff have performed basic limnological field measurements in the Upper Mississippi River System. The period of this report (1993–96) includes a major revision of the LTRMP sampling design in 1993 that added randomization, broader spatial coverage, and increased monitoring of tributaries and locations that allow monitoring of material transport. Two significant floods (1993 and 1995) occurred in the reporting period. In 1993, the La Grange reach of the Illinois River was above the 1940–96 mean river stage for most of the year and was below flood stage for only three brief periods. The flood in spring 1995 receded sooner than in 1993; however, the 137 m (450.66 feet) peak on May 31, 1995, was the third highest river elevation recorded at Havana, Illinois. Low dissolved oxygen levels in the main channel were also notable in 1993–96, with concentrations at or below 5 mg/L observed each year.

**Key words:** Annual report, limnology, LTRMP, Mississippi River, water quality

## Introduction

The Upper Mississippi River is a major resource of multiple uses that include navigation, water supply, hydroelectric generation, fish and wildlife habitat, and recreation. Effective management of this resource requires scientific understanding of the ecosystem and of its long-term trends and conditions. To meet this need, Congress authorized a Long Term Resource Monitoring Program (LTRMP) for the Upper Mississippi River System (UMRS). The LTRMP, begun in 1988, is intended to provide scientifically sound and useful information by using consistent and reliable methods to monitor and evaluate long-term changes in selected physical, chemical, and biological characteristics.

The LTRMP water quality staff collects basic information on selected physical and chemical features of the UMRS to aid in the interpretation or prediction of long- and short-term patterns. The data focus on a subset of limnological variables (i.e., physicochemical features, suspended sediment, and major plant nutrients) known to be significant to aquatic habitat in this system. The LTRMP is designed to complement, not replace or duplicate, the monitoring programs of other state and Federal agencies. It therefore includes some limnological characteristics not routinely monitored in water quality programs, and it excludes others that are of concern primarily for human consumption or regulatory purposes (e.g., chemical oxygen demand, biochemical oxygen demand, total coliform bacteria, fecal coliform bacteria, fecal streptococcus, heavy metals, pesticides, and polychlorinated biphenyls).

The present report is one in a series summarizing limnological monitoring at each of the LTRMP field stations. This report is intended to (1) document those aspects of sample collection (e.g., sampling times, period of record, sample locations, and allocations among strata) needed for valid interpretation of the data, and (2) report limnological conditions. Detailed analyses and interpretation of the limnological data are reported separately. This report covers multiple years.

To improve readability and increase the usefulness of this document as a reference, the many graphic and tabular summaries are included as appendixes. These appendixes are referenced extensively in the main body of the report, and each appendix contains explanatory information that allows it to be used as a nearly independent document.

The data presented here represent a concerted effort by personnel of the Illinois Natural History Survey and the U.S. Geological Survey who collected, compiled, verified, and organized the data. The specific data used in this report have been archived at the Upper Midwest Environmental Sciences Center (UMESC) La Crosse, Wisconsin, (formerly the Environmental Management Technical Center, Onalaska, Wisconsin), and are available on request. This archival step isolates these data from the dynamics (additions and corrections) of the main LTRMP database and thus facilitates the reexamination, reconstruction, or expansion of the results presented here.

## The Upper Mississippi River System

The basin of the UMRS (about 490,000 $km^2$) extends from north-central Minnesota to the Ohio River confluence near Cairo, Illinois. The enabling authorization for the LTRMP, however, restricts monitoring to the geological floodplain (about 2% of the total drainage). The LTRMP study areas include selected sections of the Mississippi River (Navigation Pools 4, 8, 13, and 26), La Grange Pool of the Illinois River, and the open river reach (Middle Mississippi River) between the Missouri River and Ohio River confluences (Figure 1).

Field teams of the LTRMP monitor more than 2,000 km of large river; across this expanse there exist distinct differences in climate, geomorphology, surficial geology, and land use. Patterns that arise from the north–south orientation of the system are overlain by upstream to downstream changes related to river size (Vannote et al. 1980). Consequently, the areas monitored by individual field stations differ markedly in the distribution and characteristics of aquatic habitat and aquatic biota. The LTRMP monitoring design must contend with these differences by being flexible enough to accommodate local conditions but appropriately uniform across all study areas to permit comparison and synthesis.

Dam construction on the Upper Mississippi and Illinois Rivers has profoundly altered these rivers, creating a series of rapidly flushed impoundments connected by short stretches of flowing river that are influenced by dam operations (Figure 2).

The dams on the main stem of the Upper Mississippi River are numbered from upstream to downstream (starting near St. Paul, Minnesota), and the river reach above each dam is called a pool (Table 1a). The pool has the same numeric designation as the downstream dam. For example, Pool 14, near Clinton, Iowa, includes the entire reach of river upstream of Lock and Dam 14 and downstream of Lock and Dam 13. A similar system is used on the Illinois River, but the individual dams are named rather than numbered (Table 1b). Although the navigation dams have created significant zones of permanent inundation in Pools 1–13 of the Upper Mississippi River, these zones are usually less than half the total water surface within the pool (LTRMP aquatic areas database) and are semifluvial (average hydraulic residence times

<2 days). Between Pools 13 and 26 in the Mississippi River and in most of the Illinois River, the navigation dams have deepened the river and widened it slightly, but have permanently inundated little terrestrial area compared with major river impoundments and have created minimal lake-like habitat. The term pool is therefore misleading inasmuch as it suggests that the UMRS is a stair-step series of lake-like impoundments. Nonetheless, the term is widely used and recognized by those familiar with the UMRS, and it is used freely in this report.


**Figure 1.** The Long Term Resource Monitoring Program (LTRMP) study area. Although the Missouri River is shown for reference, only the mouth of this tributary is sampled for water quality under the LTRMP.

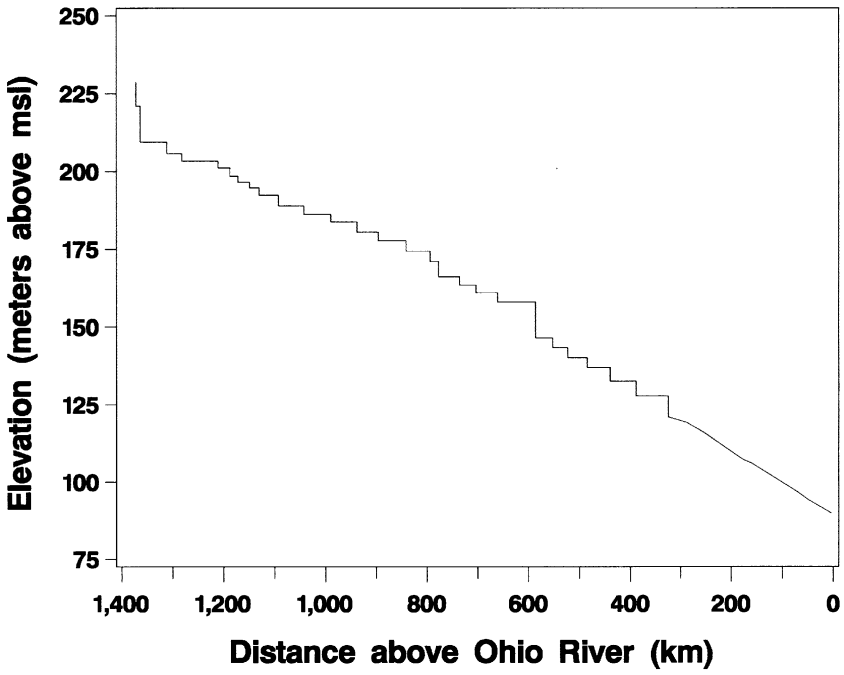


**Figure 2a**. Water surface elevation (meters above mean sea level) of the Mississippi River from the head of navigation near St. Paul, Minnesota, to the confluence of the Ohio River near Cairo, Illinois.

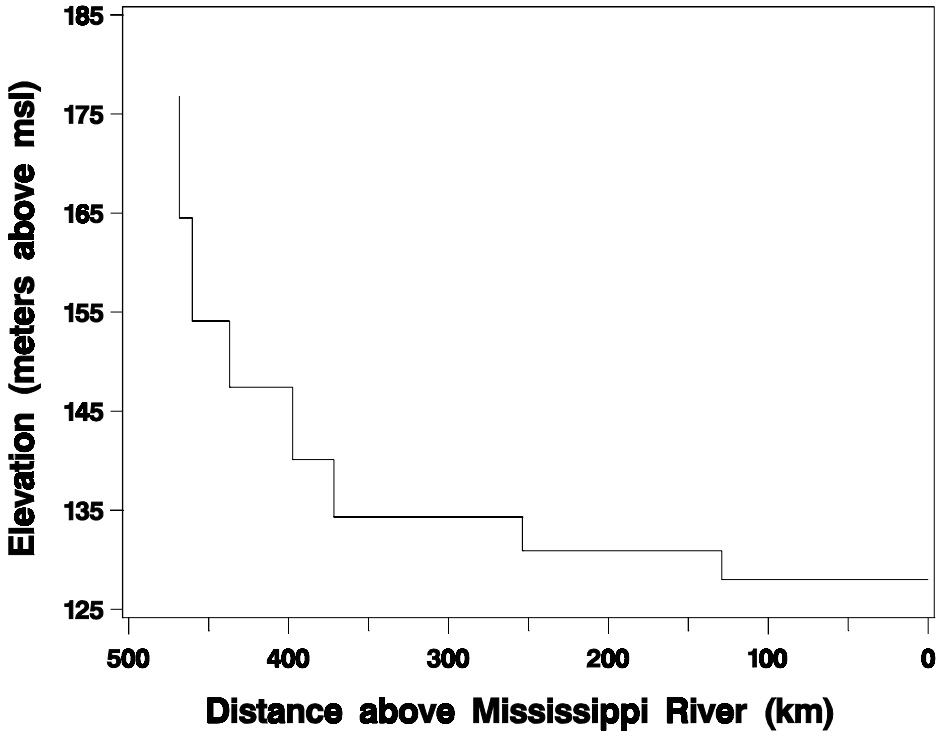


**Figure 2b**. Water surface elevation (meters above mean sea level) of the Illinois River from Lockport, Illinois, to the confluence of the Mississippi River near Grafton, Illinois.

**Table 1a.** Dams on the Upper Mississippi River.

| Name of dam | Date placed in service | City | River mile | Drainage area ($km^2$) | Dam height (m) | Pool elevation (feet) |
|---|---|---|---|---|---|---|
| Lower St. Anthony Falls | 11/13/1958 | Minneapolis, Minnesota | 853.2 | 51,000 | 7.3 | 750.0 |
| 1 | 07/03/1917 | St. Paul, Minnesota | 847.6 | 51,000 | 11.3 | 725.1 |
| 2 | 07/01/1931 | Hastings, Minnesota | 815.2 | 96,000 | 3.7 | 687.2 |
| 3 | 07/21/1938 | Red Wing, Minnesota | 796.9 | 117,000 | 3.7 | 675.0 |
| 4 | 05/25/1935 | Alma, Wisconsin | 752.8 | 148,000 | 2.4 | 667.0 |
| 5 | 05/29/1935 | Minneiska, Minnesota | 738.1 | 152,000 | 2.1 | 660.0 |
| 5a | 07/06/1936 | Winona, Minnesota | 728.5 | 153,000 | 2.7 | 651.0 |
| 6 | 06/30/1936 | Trempealeau, Wisconsin | 714.3 | 155,000 | 1.7 | 645.0 |
| 7 | 04/19/1937 | Dresbach, Minnesota | 702.5 | 161,000 | 2.0 | 639.0 |
| 8 | 04/26/1937 | Genoa, Wisconsin | 679.2 | 168,000 | 2.4 | 631.0 |
| 9 | 07/08/1937 | Lynxville, Wisconsin | 647.9 | 172,000 | 3.4 | 620.0 |
| 10 | 11/26/1937 | Guttenberg, Iowa | 615.1 | 206,000 | 2.7 | 611.0 |
| 11 | 09/14/1937 | Dubuque, Iowa | 583.0 | 211,000 | 2.4 | 603.0 |
| 12 | 05/14/1939 | Bellevue, Iowa | 556.7 | 213,000 | 3.4 | 592.0 |
| 13 | 05/13/1939 | Clinton, Iowa | 522.5 | 221,000 | 2.7 | 583.0 |
| 14 | 06/14/1939 | Le Claire, Iowa | 493.3 | 229,000 | 3.3 | 571.9 |
| 15 | 03/07/1934 | Rock Island, Illinois | 482.9 | 229,000 | 4.9 | 561.0 |
| 16 | 07/10/1937 | Muscatine, Iowa | 457.2 | 257,000 | 2.7 | 545.0 |
| 17 | 05/14/1939 | New Boston, Illinois | 437.1 | 258,000 | 2.4 | 536.0 |
| 18 | 09/08/1937 | Burlington, Iowa | 410.5 | 294,000 | 3.0 | 528.0 |
| 19 | 06/12/1913 | Keokuk, Iowa | 364.2 | 308,000 | 11.6 | 518.2 |
| 20 | 06/09/1936 | Canton, Missouri | 343.2 | 348,000 | 3.0 | 480.4 |
| 21 | 07/21/1938 | Quincy, Illinois | 324.9 | 348,000 | 3.2 | 470.0 |
| 22 | 07/22/1938 | Saverton, Missouri | 301.2 | 356,000 | 3.1 | 459.5 |
| 23[a] | — | | | | | |
| 24 | 1940 | Clarksville, Missouri | 273.4 | 365,000 | 4.6 | 449.2 |
| 25 | 05/18/1939 | Cap Au Gris, Missouri | 241.4 | 368,000 | 4.6 | 434.9 |
| 26[b] | 05/01/1938 | Alton, Illinois | 202.9 | 443,000 | 6.7 | 419.0 |
| Melvin Price | 1990-1994 | Alton, Illinois | 200.8 | 444,000 | 7.3 | 419.0 |

[a]Lock and Dam 23 was never built.
[b]Lock and Dam 26 was removed after the Melvin Price Dam was placed in service.

**Table 1b.** Dams on the Illinois River.

| Name of dam | Date placed in service | River mile | Drainage area ($km^2$) | Dam height (m) | Pool elevation (feet) |
|---|---|---|---|---|---|
| Thomas J. O'Brien[a] | 1960 | 326.5 | 0 | 1.2 | 583.5 |
| Lockport | 1933 | 291.1 | 1,900 | 12.3 | 579.5 |
| Brandon Road | 1933 | 286.0 | 3,900 | 10.4 | 539.0 |
| Dresden Island | 1933 | 271.5 | 18,800 | 6.7 | 505.0 |
| Marseilles | 1933 | 247.0 | 21,400 | 7.3 | 483.0 |
| Starved Rock | 1933 | 231.0 | 28,600 | 5.8 | 459.0 |
| Peoria | 1938 | 157.7 | 37,700 | 3.4 | 440.0 |
| La Grange | 1939 | 80.2 | 66,400 | 2.9 | 429.0 |

[a]This structure controls diversion discharge into the Illinois waterway from outside the drainage basin (Lake Michigan)

The first major dam on the Upper Mississippi River was constructed in 1913 near Keokuk, Iowa, and was followed by 27 additional dams on the main stem to create a 2.7-m (9-foot) navigational waterway from Alton, Illinois, to St. Anthony Falls near St. Paul, Minnesota. Twenty-two dams were built between 1935 and 1940; the last dam was completed in 1958 at Lower St. Anthony Falls near Minneapolis (Table 1a). The navigation system was altered significantly in 1993 when Lock and Dam 26 at Alton was replaced by a new structure (Melvin Price Locks and Dam) with increased lock capacity about 3.2 km (2 miles) farther downstream. The previous Lock and Dam 26 was removed after the new structure was completed.

The history of impoundment on the Illinois River is similar to that of the Upper Mississippi River, and the Illinois River is now divided into six navigational pools (Table 1b). The first dams were completed on the upper portions of the Illinois River (Starved Rock, Marseilles, and Dresden Island) in 1933; additional dams at Peoria and La Grange were completed in 1938. The Melvin Price Locks and Dam on the Mississippi River near Alton, Illinois, also impounds the lowermost portion of the Illinois River.

## Methods

### *Study Area*

The study area of the LTRMP includes the Mississippi River from Cairo, Illinois, to the head of navigation near St. Paul, Minnesota; the Illinois River; and navigable portions of the Kaskaskia, Black, and St. Croix Rivers. In recognition of the highly variable and widely differing river characteristics within this large study area, the Comprehensive Master Plan (Jackson et al. 1981) recommended 17 pools or reaches for detailed monitoring. Available resources, however, have limited the LTRMP to six selected areas, and the five states bordering the Upper Mississippi River now operate six LTRMP monitoring stations that focus on these specific reaches. These areas (Figure 1) are concentrated in the uppermost segments of the Mississippi River. The river sections presently monitored under LTRMP for water quality include Pools 4, 8, 9, 12, 13, 14, and 26 in the impounded portion of the Upper Mississippi River; 130 km (80 miles) of the open river above the Ohio River confluence at Cairo, Illinois; and La Grange Pool of the Illinois River. All of the major tributaries of the Mississippi and Illinois Rivers in these river segments are monitored under the LTRMP. The long (400 km) reach of the Upper Mississippi River between Pools 14 and 26 is not monitored under

the LTRMP, but other state and Federal programs collect water quality information in this reach and adjoining tributaries (i.e., Iowa-Cedar, Rock, and Des Moines Rivers).

Personnel from the Illinois Natural History Survey, Havana Field Station, conduct LTRMP monitoring on La Grange Pool, defined by Peoria Lock and Dam at Illinois River mile 157.7, La Grange Lock and Dam at Illinois River mile 80.1, and adjacent portions of the Illinois River and its tributaries (Figure A-1). The LTRMP water quality has been monitored on La Grange Pool since 1989 (Appendixes A and B).

The drainage area of the La Grange reach is the smallest of any LTRMP study area, roughly the same (50,000 $km^2$) as the uppermost impoundment on the Mississippi River (St. Anthony Falls). In addition, about 20% of the flow volume (90 $m^3/s$) in La Grange Pool is diversion water from Lake Michigan (through the Chicago Sanitary and Ship Canal) and a large part (15–20%) of the catchment is urbanized (by the Chicago metropolitan area). The Illinois River valley is also notable for its unusual geomorphology and extensive human modifications (levee construction and agriculture). The present channel of the lower Illinois River (from Henry to Grafton, Illinois) was originally occupied by the much larger Mississippi River before this larger river was diverted to the west by glacial action. Consequently, the large size and low slope of the Illinois River channel and floodplain are not matched to the present drainage area and volume of flow. Because of this, the reach has an unusually large number of backwaters and is unable to transport the high sediment loads delivered by its tributaries from intensively farmed areas (cf. Demissie et al. 1992). Unlike the braided-channel reaches of the Upper Mississippi River main stem, the Illinois River floodplain has been extensively leveed and isolated from the river.

Zebra mussels, *Dreissena polymorpha*, were first reported in the Illinois River in 1991 in Bath Chute (La Grange reach) with increasing numbers through 1993. Scientists from the Illinois Natural History Survey performed a variety of studies including population analysis, zebra mussels versus native unionid, growth models, and veliger collections. The veliger collections are still being conducted. Another invasive species, *Daphnia lumholtzi*, was discovered in 1995; its presence is being monitored by Illinois Natural History Survey. The Illinois Nutrient and Sediment Assessment (Illinois State Water Survey 1998) is presently attempting to assess nutrient and sediment transport by the Illinois River and its tributaries and determine how this may be affecting the nutrient and sediment loads to the Gulf of Mexico.

## *Monitoring Network and Sampling Design*

The LTRMP was begun in 1988; field stations were added to the network from 1988 to 1991 (Table 2). This staggered start is significant when making comparisons among study areas or assessing overall trends across the system. Limnological monitoring during the first years (1988–91) was limited to fixed sites and to in situ physical and chemical measurements. The present LTRMP sampling design (implemented in June 1993) includes both fixed-site (Appendix A) and stratified random sampling (SRS; Appendix B) and combines in situ field measurements with laboratory analyses of chemical constituents (Appendix C).

Fixed-site sampling in the present design monitors inflows (tributaries and dam releases) and outflows from each of the LTRMP study areas. Secondarily, fixed sites are used to monitor locations of special significance, either because of their long data record or some other feature that makes them notable or especially interesting. Each LTRMP field station monitors about 15–30 fixed sites biweekly with no attempt to capture or avoid high or low flows (Appendix A).

**Table 2.** Period of operation for each of the Long Term Resource Monitoring Program field stations.

| Field station | 1988 | 1989 | 1990 | 1991 | 1992–1996 |
|---|---|---|---|---|---|
| Lake City | | | Jan | | |
| Onalaska | Jul | | | | |
| Bellevue | Aug | | | | |
| Pool 26 | Jul | | | | |
| Open River | | | | Mar | |
| Havana | | Sept | | | |

From 1988 to 1993, the LTRMP used 24 aquatic habitat classes (Appendix A) to describe the permanently fixed monitoring sites. Some of these classes included a seasonally varying attribute (aquatic vegetation) as part of their definition, and the classes were not mutually exclusive. For example, a site in midchannel downstream of a dam might be classified as "Main Channel" (MC), "Channel Trough" (CTR), "Open Tailwater" (TWR-O), or "Tailwater" (TW). This classification scheme was revised in 1993 when vegetation status was dropped from the habitat designators and those categories that were viewed as redundant or not distinguishable by routine water quality measurements were eliminated. The revised system has seven habitat classes (Table A-4), and all previous habitat classifications for fixed sites were converted to this system. The original designations for all fixed sites are permanently on file at UMESC and at the individual field stations.

As with the six field stations, the period of record differs among individual fixed sites. When the emphasis of fixed-site sampling shifted to tributaries and other transport monitoring points in 1993, sites were added and eliminated from the sampling network in each study reach. At the same time, sampling frequency at fixed sites was reduced from weekly to biweekly (Figure A-2) to keep the overall level of monitoring constant despite the addition of SRS.

The habitat class associated with each fixed site provides useful ancillary information about the site and a convenient way to retrieve data from the LTRMP database. However, LTRMP fixed-site data cannot be used generally to make inferences about these habitat classes because fixed sites were chosen subjectively and without randomization and represent only specific locations. Although the sampling sites can be grouped by their habitat categories, the resultant groupings are not unbiased samples of these categories. To overcome this limitation, the monitoring design was modified in 1993 to include SRS and thus provide unbiased information about broad spatial areas.

The LTRMP design for both fixed-site sampling and SRS, established in September 1993, requires that each day's sampling effort be centered on noon (1200 h), central standard time, and that the order of site visits within each sampling day be randomized to the extent feasible within operational constraints.

The SRS complements the fixed-site design and provides a seasonal assessment of known precision and confidence on limnological conditions in broad sampling strata in the LTRMP study areas. Limnological data from SRS are intended to be linked to patterns in fish, vegetation, and invertebrates at the spatial scale of a whole navigational pool or river reach and at temporal scales ranging from seasons to decades. The SRS data can be interpreted confidently at these scales of space and time. Higher resolution questions (e.g., short-term movements or locations of fish, growth dynamics within individual aquatic plant beds) are outside the realm of routine monitoring as defined by the LTRMP and are not addressed by SRS or fixed-site sampling in the LTRMP monitoring design.

The SRS is performed in four quarterly episodes each year (Appendix B). In each SRS episode, about 130 sites are randomly selected from six sampling strata and sampling is completed usually within 14 days (Appendix B). The sampling strata are condensed from the geomorphic aquatic areas of Wilcox (1993) and are objectively defined in a geographic information system (Owens and Ruhser 1996). Specific sampling points for each sampling episode are selected by overlaying a square grid with 200-m spacing on a map of the sampling strata. Grid intersections are randomly selected for each sampling episode. Beginning in spring 1995, a 50-m grid was used for side channel and backwater strata. A smaller grid spacing was deemed appropriate to the spatially diverse conditions within these strata (i.e., points 50 m apart are likely to be different); this increases the number of potential sites available for site selection. Although the number of sites selected was not altered by this change in grid spacing, the number of locations resampled in subsequent episodes was greatly reduced. The allocation of samples among strata emphasizes off-channel areas and is not proportional to the surface area of the strata (Appendix B). Data from the strata must be weighted to obtain accurate poolwide or reachwide estimates, and this weighting must account for the areas of the strata, the differing grid intervals among the strata, changes to the grid in 1995, and the allocation of sampling effort (Appendix B).

The sampling strata used by the LTRMP are primarily a statistical tool that allows the spatial allocation of sampling effort to match differences in desired precision and variability among the strata. An exact correspondence between sampling strata and the aquatic areas of Wilcox (1993) is not attainable and is not required by the LTRMP statistical design. The data from a sampling stratum, therefore, should not be regarded as precisely representing a specific aquatic area type.

Because the river is dynamic, the borders of the aquatic areas change over time, but the sampling strata boundaries have been (with minor exceptions) static since their original designation in 1993. Thus, the aquatic areas are expected to gradually diverge from the sampling strata because of long-term changes in river morphology. In addition, short-term fluctuations in water level can make sites unusable or atypical of their parent stratum. The field teams use data comments to report sites that cannot be sampled or seem to be outside their designated sampling stratum. These comments are extremely valuable for data interpretation and also give a rough indication of the rate or extent of divergence between the sampling strata and the aquatic areas. However, field comments lack the spatial intensity and consistency required to track or map changes in stratum boundaries, and the LTRMP staff intends to track changes in aquatic areas by systemwide remapping and reclassification of areas at regular (e.g., 10-year) intervals. If future remapping results in new sampling strata, all sampling locations will have both pre- and postrevision stratum codes assigned. This will allow analysis for the full period of monitoring to be based on either mapping scheme.

The capacity of the LTRMP analytical laboratory has restricted the number of chemical measurements performed on SRS samples. Consequently, from 1993 to 1996, SRS has included major plant nutrients, suspended solids, and phytopigments, but has excluded major cations (sodium, magnesium, calcium, potassium) and major anions (chloride and sulfate). In situ measurements are made at all SRS sites; to reduce the laboratory sample load, samples are collected for a full complement of laboratory analyses only in a randomly selected subset (about half) of sites.

### *Sample Collection*

The LTRMP limnological monitoring includes measurements at multiple depths (Soballe and Fischer 2003). About 80% of LTRMP measurements from 1993 to 1996 were taken near the water surface (0.0 to 0.20 m); laboratory analyses during this period were performed only on near-surface and near-bottom samples. The LTRMP sampling for water quality is generally restricted to waters 0.2 m deep or deeper.

However, samples are occasionally collected in shallower waters, particularly under ice cover, when this can be done without disturbing the substrate. Discrete, rather than integrated, samples are collected and analyzed. Grabs for chemical analyses are taken with either a bucket (near surface) or a Van Dorn sampler (at depth).

When the sampling design was revised in 1993, grab-sampling techniques remained unchanged; however, individual instruments used to monitor pH, conductivity, temperature, and dissolved oxygen were replaced by a multiparameter monitoring device used for in situ measurement and recording. The LTRMP Procedures Manual (Soballe and Fischer 2003) provides additional details.

Ice cover can vary widely in extent and thickness across the study area, complicating sample collection and the recording of sample information. It is not meaningful, for example, to report limnological conditions at 0.2 m below the water surface when the ice extends below this depth, nor to report maximum water depth when ice extends into the substrate. Consequently, when ice is present, LTRMP crews collect near-surface samples at 0.2 m below the bottom of the ice (where possible). The reported sampling depth in this situation (0.2 m) must be adjusted for the vertical extent of ice below the water surface (also recorded) to determine the actual vertical location of the sample in reference to the free water surface. Here we summarize the data by depth sampling category rather than precise vertical location; the sampling depths have not been adjusted for the vertical extent of ice below the water surface. In addition, sites that were frozen to the substrate have been excluded from the summaries of water depth.

### *Laboratory Analyses*

The LTRMP added a limited suite of laboratory analyses to the limnological monitoring in 1991 and expanded the list of chemical constituents in 1993 (Appendix C). From 1991 to 1993, samples for chemical analysis were collected biweekly during the ice-free period; this frequency was reduced to monthly in winter. Also during this period, chemical analyses were performed at the Waterways Experiment Station (WES) laboratories at Vicksburg, Mississippi, and the U.S. Army Corps of Engineers Eau Galle laboratory near Spring Valley, Wisconsin. In 1993, analysis of LTRMP limnological samples was gradually shifted to the UMESC (Table C-2).

In late summer and fall 1996, the UMESC analytical laboratory experienced contamination in its total phosphorus analyses. The problem was eventually identified and eliminated in December 1996; those analytical results affected by this contamination have been excluded from this report and are identified in the LTRMP database. The laboratory also experienced ammonia contamination in May 1996, which invalidated many of the ammonium samples collected in the spring 1996 SRS episode. Those data have also been excluded from this report. Detailed descriptions of the methods used by the UMESC and WES laboratories are available on request from the UMESC in La Crosse, Wisconsin.

### *Quality Assurance and Quality Control Procedures*

The value of LTRMP data depends on their quality and reliability. The use of standard methods to assure and control the quality of the data are thus extremely important. The original LTRMP procedures (Lubinski and Rasmussen 1988) gave guidance on instrument calibration, record keeping, data management, and organizational relations. Revisions to the procedures (Soballe and Fischer 2003) provided details on assessing the accuracy and precision of field measurements and laboratory determinations and also addressed issues (i.e., daily and seasonal sampling windows, randomization of sampling sites and times) related to the

conduct of field work. Guidelines for the time of sampling and randomization of sampling were implemented in 1993, and compliance with these guidelines is reported here (Appendix D).

The LTRMP field teams began collecting additional Quality Assurance and Quality Control (QA/QC) measurements and samples near the end of April 1995 to assess the accuracy and precision of both laboratory and field measurements. The QA/QC sampling data are readily available (http://www.umesc.usgs.gov/data_library/water_quality/water_quality_page.html), but not summarized here.

Following the recommendations of APHA (1992), at least 5% of each type of chemical or physical measurement collected by an LTRMP water quality team is accompanied by a series of QA/QC measurements, and each sampling crew is required to perform at least one QA/QC series during each day of field work. The daily crew requirement results in about 15% of all samples being accompanied by QA/QC measurements, exceeding the APHA recommendation and LTRMP minimum requirement. Because of logistic constraints, the LTRMP did not use field spikes (additions of known concentrations of chemical constituents)in 1993–96, but did collect four types of QA/QC samples:

Routine: The regular or routine sample or measurement taken at the site.

Field split: A field sample that is as similar as possible to the routine sample at the point of collection. It is used to evaluate laboratory precision and variability introduced by field handling or processing. Field splits are performed for all the constituents listed in Table C-2 that are presently analyzed.

Blank: A sample used to check for contamination of the analytical water supply or sample containers, or contamination and losses during handling and storage. It is also used to evaluate precision at concentrations near the detection limit.

Replicate: A second, separate sample taken at the same location and in the same way as the routine, but separated by an interval of 5–10 minutes. This provides information on natural, random background variability in ambient conditions.

## Results

### *River Discharge Regime*

River discharge (flow) is a major factor in the ecological and limnological structure and functioning of the UMRS. Flow strongly influences limnological conditions and, thus, the interpretation of the monitoring data must consider the hydrologic setting (flow regime) under which the data were collected. Because river discharge is so important, staff of the LTRMP have assembled the Mississippi and Illinois River discharges and surface elevation data collected by the U.S. Geological Survey and the U.S. Army Corps of Engineers into a database at the UMESC (Wlosinski et al. 1995). The discharge and water elevation data used in this report were obtained from that database.

Water levels at the Havana gage (Figure 3) represent the hydrologic regime in La Grange Pool. Flood stage at this gage is 133.62 m (438.40 feet) above mean sea level. Water levels at this gage fluctuated substantially above and below the 56-year average during this reporting period and, with the possible exception of 1994, none of the annual hydrographs resemble the average closely. High discharges during the flooding of 1993 were less pronounced than on the main stem of the Mississippi River, but the duration of high water in 1993 was remarkable. Except for two short periods, the river was above the 56-year average

for all of 1993. The third highest river elevation on record for Havana, Illinois, was on May 31, 1995, at 137.36 m (450.66 feet), with the highest recorded elevation being 137.62 m (451.50 feet) in 1943. On the other extreme, 1996 was below the 56-year average except for the two high-water periods in summer. These patterns have undoubtedly influenced the limnological data.

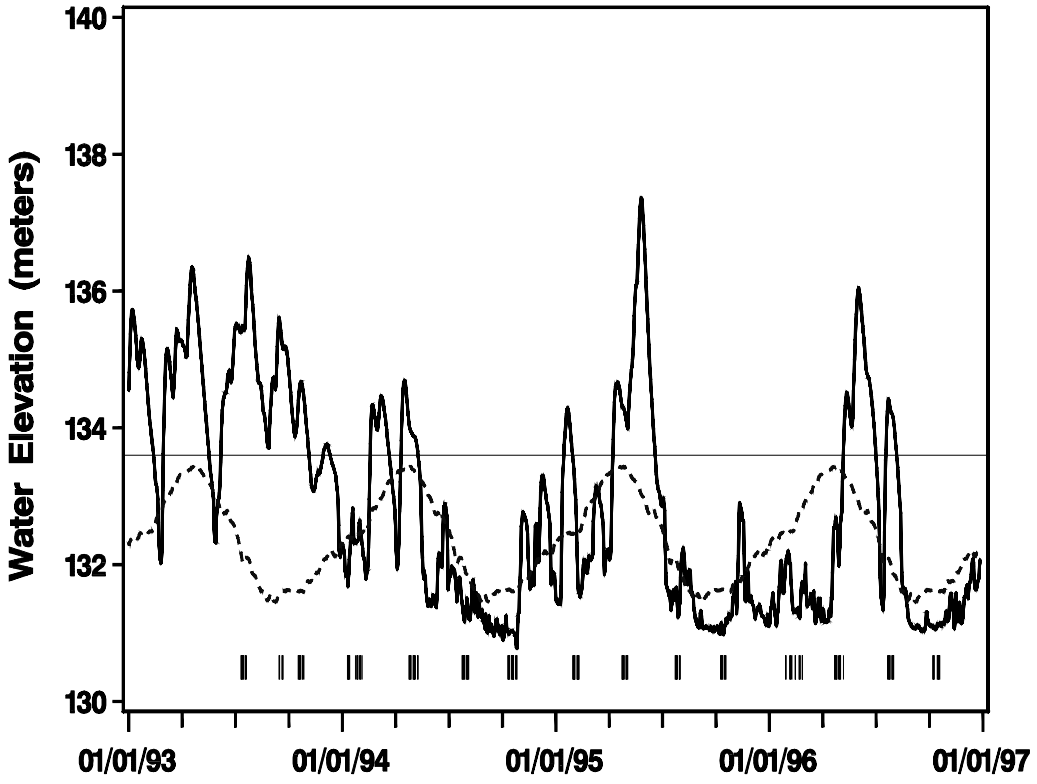


**Figure 3.** Water elevation (meters above mean sea level) of the Illinois River at Havana from 1993 through 1996 (*solid line*) and the 1940–1996 average annual hydrograph (*dashed line*). Vertical lines above the horizontal axis indicate dates of stratified random sampling. Water elevation for flood stage is indicated by the horizontal line.

## *Fixed-site Sampling*

### Sample Collection and Field Measurements

The volume of field work completed by each field station is important to document for planning and budgetary purposes. The schedule of sample collection is also important to report because many of the limnological characteristics monitored by the LTRMP exhibit regular daily (diel) patterns. The time of measurement can thus strongly influence the value that is observed and, because the LTRMP strives to monitor patterns over time across the UMRS, it is important that sampling times be consistent and unbiased over time, among sampling locations, and among field stations.

In 1993–96, the Havana water quality team made about 1,550 site visits to fixed sampling locations. During these visits, about 1,150 grab samples were collected for chemical processing (Appendix E). The number of site visits during each week of sampling was typically 18–22 (Figure D-1 and Table D-1); the

redesign in 1993 reduced the weekly number of site visits by more than 50% (Figure D-1) to 13. Although deviations from the normal fixed-site sampling schedule were rare, they were sometimes required because of unsafe field conditions or equipment failures (Table D-1).

The field efforts of the Havana water quality team have conformed well to the overall LTRMP sampling design. The distribution of sampling across the hours of the day (Figures D-2–D-4 ) shows little effect of the September 1993 change in the fixed-site sampling protocol because the sampling by the Havana water quality team was already centered on 1200 h. The slight tendency to sample more in the morning than in the afternoon that was evident in 1993 was corrected when the sampling window was formally defined, and subsequent years show a symmetrical pattern of sampling times that are centered within 10 minutes of noon. Although there is no apparent seasonal pattern in fixed-site sampling times by the Havana team, a slight (about 5 minutes per year), but significant ($P < 0.001$), downward trend is evident in the time of sample collection.

The distribution of sites by median sampling times (Figure D-4) also shows good compliance with the design goals. The sites are distributed tightly around noon with median sampling times at most sites within 30 minutes of 1200 h (Figure D-4).

## Fixed-site Sampling Data

Fixed-site sampling by the Havana Field Station staff from 1993 to 1996 has generated a large volume of data (Appendix E). These data allow comparisons of tributary and main-stem inflows and outflows within this study area and thus provide information on sources of material such as nutrients and suspended sediment and the functioning of the study reach as a processor of those materials.

Oxygen solubility in water is a function of temperature and thus dissolved oxygen concentration shows strong seasonality at all sites. The daily extremes in dissolved oxygen are not revealed by monthly mean values (Figure E-1), and the LTRMP sampling schedule (centered on noon) does not give a good representation of extremely low (expected near sunrise) or high (expected in mid- or late afternoon) oxygen concentrations.

Low dissolved oxygen concentrations in the main channel of the Illinois River were observed during 1993–96, with levels at or below 5 mg/L each year. The lowest observed concentration was 4.0 mg/L (Table E-1). In 1996, the lowest main channel dissolved oxygen level was 5.1 mg/L (Table E-1). The dissolved oxygen data suggest little change in concentration from upstream to downstream (Figure E-1a) within this reach.

Turbidity and suspended solids concentrations are closely linked. The main and side channel sites were relatively high in turbidity and suspended solids, whereas backwater areas had much lower values. Tributaries had the highest and most variable values; for example, a turbidity of five nephelometric turbidity units was seen in the La Moine River (LM07.2M) in summer 1995, and a value of 5,500 nephelometric turbidity units was observed under the ice in 1996 (Table E-1).

Silica concentrations at fixed sites showed an unexpected pattern; they were lower and somewhat less variable in the main and side channels (mean = 4.2 mg/L, standard deviation = 1.9) than at backwater and tributary sites (mean = 2.7 mg/L, standard deviation = 1.2). Also notable were the mean total phosphorus and soluble reactive phosphorus concentrations; both constituents were higher at the main and side channel sites (total phosphorus = 0.33 mg/L, soluble reactive phosphorus = 0.14 mg/L) than in the tributaries and

backwaters (total phosphorus = 0.23 mg/L, soluble reactive phosphorus = 0.05 mg/L). However, the Sangamon River (SG16.2C) was a notable exception, with elevated mean concentrations of total phosphorus (0.38 mg/L) and soluble reactive phosphorus (0.12 mg/L) that were about the same as in the main and side channels.

## *Stratified Random Sampling*

### Sample Collection and Field Measurements

As in fixed-site sampling, the number and frequency of samples collected and the scheduling of sample collection in SRS is important for planning and data interpretation. Sample collection in SRS must be consistent and unbiased over time, within each sampling episode, across sampling strata, and among LTRMP field stations. The partitioning of effort among strata within each SRS episode (Table B-1) reflects an emphasis on off-channel areas and a recognition that these areas are probably more spatially variable than the main channel.

During 1993–96, Havana Field Station personnel participated in 14 SRS episodes. In these 14 episodes, the field team visited about 1,800 sites (Appendix B) and collected about 1,500 grab samples for chemical analyses. All of these samples were analyzed for chlorophyll and suspended solids; however, in accord with the design for SRS, only about two-thirds (900) were also analyzed for nitrogen and phosphorus species.

The total number of sites sampled in each episode and stratum was relatively uniform across the period of record (Table B-2). In five SRS episodes, fewer sites than normal were sampled because of environmental factors. Extremely low water reduced the number of sites sampled during three of the four fall SRS episodes (1994, 1995, and 1996), with unsafe ice conditions reducing the number of sites sampled during two of the three winter SRS episodes (1994 and 1996).

The SRS sampling by the Havana field team has conformed to the general LTRMP design, although some minor adjustments are needed. The distribution of SRS times across the period of record (Figure D-5) shows no consistent seasonal pattern and no significant linear trend in sampling times over the years ($P > 0.20$) except in backwaters. In this stratum, the time of sample collection tends to be slightly earlier (4–5 minutes) in each successive episode. This trend can be distinguished statistically ($P < 0.001$) from a constant sampling time. A tendency to conduct SRS more in the afternoon than in the morning is also evident.

### Stratified Random Sampling Data

The SRS provides an unbiased estimate of conditions within each sampling stratum during each of four quarterly episodes per year. Seasonality, interannual variations, and long-term trends within each stratum can be assessed with summaries of these data (Appendix F); however, some of the most valuable applications for these data require analyses that are beyond the scope of this report. For example, the SRS provides statistically valid estimates of the extent or frequency of limnological conditions in combination (e.g., to meet the temperature, dissolved oxygen, and velocity requirements of overwintering fish), this information is being used to address changing relations among limnological variables over time, differences among the sampling strata, and habitat availability and suitability in the Upper Mississippi River ecosystem (Fischer et al. 1997; Soballe et al. 1997).

The data collected by the Havana field team in SRS reveal long-term patterns in this reach of the Illinois River and document significant differences in concentrations and year-to-year variability among the sampling strata (aquatic areas).

Spring and summer 1993 was a period of record flooding along the main stem of the Mississippi River and many of its tributaries. Although 1993 was a high-water year in the Illinois River, more flooding in the La Grange reach was even more pronounced 2 years later (spring 1995). These events undoubtedly influenced the water quality data collected during SRS, but immediate effects are not obvious in the data summaries and analyses beyond the scope of this summary report are needed to adequately address the influence of these events on water quality in the La Grange reach.

Compared with main and side channels, backwater areas show greater variation in almost every parameter, especially dissolved oxygen, Secchi transparency, total nitrogen, ammonia, and chlorophyll. (Figures F-2, F-5, F-8, F-10, and F-13). The main channel shows the least variation except for seasonal changes.

The SRS data show strong seasonal maxima in temperature and dissolved oxygen (Figure F-2). Summer and fall oxygen levels have been markedly low. In 1994 and 1995 summer SRS episodes, dissolved oxygen readings just above 5 mg/L were recorded. In summer and fall 1996 episodes, main channel dissolved oxygen fell below 5 mg/L (4.6 and 4.9 mg/L, respectively; Table F-1).

The extreme peak of ammonium nitrogen in the winter episode of 1996 in the main and side channels (Figure F-10) remains unexplained. However, high values of ammonium are common in winter, checking of the QA/QC samples and analytical laboratory records gives no reason to doubt these values. A similar peak is reported in the analytical data from all six LTRMP monitoring stations.

## Summary and Recommendations

In this report, we document 4 years of LTRMP monitoring by the staff of the field station at Havana, Illinois, and provide basic graphic and tabular summaries of the collected data. The Havana Field Station staff completed about 1,550 visits to fixed sampling sites and 1,800 visits to stratified random sites from 1993 through 1996. This period was marked by several important events, including the redesign of the monitoring network and the updating of field equipment in 1993, and record flooding in spring and summer 1993 and 1995.

Detailed analysis of the LTRMP monitoring data can reveal a wealth of information on the condition and ecological functioning of this river reach and its tributaries over time. The general data summaries included here demonstrate that this reach of the Illinois River is turbid, has very high concentrations of plant nutrients and suspended solids, and may occasionally experience low dissolved oxygen (<5 mg/L).

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# Appendix A. Fixed-site Sampling Sites: January 1993–December 1996

In Appendix A, we provide information on the sample collection sites used from January 1993 through December 1996. In some instances, sites not used during this period have been included for reference. The site description tables provide additional information on the locations and are keyed to the site map. The sites lists are provided in three formats to allow easy cross-referencing: (1) by map identifier (north–south, then east–west), (2) in alphabetical order, and (3) by habitat class. The period of record for each site is also portrayed graphically (Figure A-5) so that the duration of and interruptions in the record can be easily visualized.

Location codes (seven characters) used for routine fixed-site sampling are based on the distance upstream from the river mouth or major confluence (river miles and tenths) and on the relative left-to-right (facing upstream) location of the site between the horizontal limits of the geological–historical floodplain. Sites on the Mississippi and Illinois River main stems use a single-letter prefix (M or I, respectively), whereas tributaries and Missouri River sites use a two-letter prefix (Table A-5). The left-to-right location of a site is indicated by a suffix between A and Z. When tributary sites are sampled in midstream, they are assigned the suffix M without regard to position in the floodplain. Locations near the left or right bank (facing upstream) are indicated with an A or Z, respectively.

Habitat classes (Table A-4) are assigned to all Long Term Resource Monitoring Program sampling locations used in fixed-site monitoring. Although these classes convey significant information about the site, the fixed sites are subjectively chosen and cannot be assumed to represent the associated habitat classes (see stratified random sampling, Appendix B).

**Table A-1.** Long Term Resource Monitoring Program fixed-site water quality sampling locations keyed to map codes with associated period of record from 1993 through 1996, habitat class, Universal Transverse Mercator (UTM) Coordinates (zone 15, meters), and the number of sampling visits to the site.

| Location code | Map identification | Period of record | Habitat class[a] | UTM | | Site visits 1993–1996 |
|---|---|---|---|---|---|---|
| | | | | Easting | Northing | |
| I157.8D | 1 | 04/28/93–12/30/96 | MC | 783249 | 4501489 | 94 |
| MK04.4M | 2 | 04/26/93–12/30/96 | TRIB | 776765 | 4491575 | 97 |
| I135.8W | 3 | 10/19/89–04/15/93 | BWI | 764092 | 4483187 | 15 |
| I135.8X | 4 | 10/19/89–04/15/93 | BWI | 764206 | 4482995 | 15 |
| I129.8W | 5 | 07/01/91–05/25/93 | BWI | 757518 | 4475007 | 16 |
| I128.8F | 6 | 08/28/90–05/25/93 | SC | 755668 | 4474868 | 16 |
| I128.8T | 7 | 09/05/89–05/25/93 | BWI | 756326 | 4474258 | 16 |
| I127.9W | 8 | 04/25/90–05/25/93 | BWI | 755714 | 4473468 | 16 |
| I124.8R | 9 | 04/25/90–05/25/93 | BWI | 751508 | 4471935 | 16 |
| I122.5X | 10 | 09/01/89–04/13/93 | BWC | 750637 | 4468394 | 15 |
| I122.6Y | 11 | 09/01/89–12/30/96 | BWC | 750707 | 4468389 | 111 |
| QV04.6M | 12 | 04/26/93–12/30/96 | TRIB | 758620 | 4468071 | 97 |
| I121.5X | 13 | 09/01/89–04/13/93 | SC | 749599 | 4466910 | 15 |
| I121.2W | 14 | 09/01/89–12/30/96 | MC | 749108 | 4466765 | 112 |
| S000.2K | 15 | 12/05/90–12/30/96 | TRIB | 748649 | 4465581 | 112 |
| I113.0T | 16 | 09/06/89–12/30/96 | SC | 743376 | 4455335 | 111 |
| I109.5D | 17 | 09/12/89–12/31/96 | BWI | 738629 | 4453509 | 85 |
| I107.2R | 18 | 09/06/89–04/12/93 | MC | 738242 | 4448885 | 15 |
| I107.0S | 19 | 09/06/89–04/12/93 | SC | 738347 | 4448554 | 15 |
| I106.8X | 20 | 10/30/89–04/12/93 | BWC | 739451 | 4447933 | 15 |
| I106.5X | 21 | 09/06/89–04/12/93 | BWC | 739042 | 4447352 | 15 |
| I106.5Y | 22 | 09/06/89–04/12/93 | BWC | 739082 | 4447313 | 15 |
| I099.4C | 23 | 09/06/89–04/12/93 | BWC | 727389 | 4445489 | 15 |
| I099.4D | 24 | 09/06/89–04/12/93 | BWC | 727389 | 4445436 | 15 |
| I098.0C | 25 | 09/06/89–04/12/93 | BWC | 725466 | 4444200 | 15 |
| I095.2C | 26 | 09/06/89–04/12/93 | MC | 722628 | 4441535 | 15 |
| I094.8D | 27 | 09/06/89–04/12/93 | SC | 722694 | 4441126 | 15 |
| SG16.2C | 28 | 04/10/92–12/31/96 | TRIB | 743373 | 4438599 | 112 |
| LM00.5M | 29 | 09/24/93–12/31/96 | TRIB | 711723 | 4429191 | 82 |
| LM07.2M | 30 | 01/20/94–12/31/96 | TRIB | 707351 | 4428445 | 78 |
| I080.2C | 31 | 01/20/94–12/31/96 | MC | 710613 | 4423724 | 78 |
| I080.2M | 32 | 04/28/93–12/31/96 | MC | 710757 | 4423711 | 93 |

[a]See Table A-4 for habitat class descriptions.

**Table A-2.** Long Term Resource Monitoring Program fixed-site water quality sampling sites sorted by location code with associated period of record from 1993 through 1996, habitat class, Universal Transverse Mercator (UTM) Coordinates (zone 15, meters), and number of sampling visits to the site.

| Location code | Map identification | Period of record | Habitat class[a] | UTM | | Site visits 1993–1996 |
|---|---|---|---|---|---|---|
| | | | | Easting | Northing | |
| I080.2C | 31 | 01/20/94–12/31/96 | MC | 710613 | 4423724 | 78 |
| I080.2M | 32 | 04/28/93–12/31/96 | MC | 710757 | 4423711 | 93 |
| I094.8D | 27 | 09/06/89–04/12/93 | SC | 722694 | 4441126 | 15 |
| I095.2C | 26 | 09/06/89–04/12/93 | MC | 722628 | 4441535 | 15 |
| I098.0C | 25 | 09/06/89–04/12/93 | BWC | 725466 | 4444200 | 15 |
| I099.4C | 23 | 09/06/89–04/12/93 | BWC | 727389 | 4445489 | 15 |
| I099.4D | 24 | 09/06/89–04/12/93 | BWC | 727389 | 4445436 | 15 |
| I106.5X | 21 | 09/06/89–04/12/93 | BWC | 739042 | 4447352 | 15 |
| I106.5Y | 22 | 09/06/89–04/12/93 | BWC | 739082 | 4447313 | 15 |
| I106.8X | 20 | 10/30/89–04/12/93 | BWC | 739451 | 4447933 | 15 |
| I107.0S | 19 | 09/06/89–04/12/93 | SC | 738347 | 4448554 | 15 |
| I107.2R | 18 | 09/06/89–04/12/93 | MC | 738242 | 4448885 | 15 |
| I109.5D | 17 | 09/12/89–12/31/96 | BWI | 738629 | 4453509 | 85 |
| I113.0T | 16 | 09/06/89–12/30/96 | SC | 743376 | 4455335 | 111 |
| I121.2W | 14 | 09/01/89–12/30/96 | MC | 749108 | 4466765 | 112 |
| I121.5X | 13 | 09/01/89–04/13/93 | SC | 749599 | 4466910 | 15 |
| I122.5X | 10 | 09/01/89–04/13/93 | BWC | 750637 | 4468394 | 15 |
| I122.6Y | 11 | 09/01/89–12/30/96 | BWC | 750707 | 4468389 | 111 |
| I124.8R | 9 | 04/25/90–05/25/93 | BWI | 751508 | 4471935 | 16 |
| I127.9W | 8 | 04/25/90–05/25/93 | BWI | 755714 | 4473468 | 16 |
| I128.8F | 6 | 08/28/90–05/25/93 | SC | 755668 | 4474868 | 16 |
| I128.8T | 7 | 09/05/89–05/25/93 | BWI | 756326 | 4474258 | 16 |
| I129.8W | 5 | 07/01/91–05/25/93 | BWI | 757518 | 4475007 | 16 |
| I135.8W | 3 | 10/19/89–04/15/93 | BWI | 764092 | 4483187 | 15 |
| I135.8X | 4 | 10/19/89–04/15/93 | BWI | 764206 | 4482995 | 15 |
| I157.8D | 1 | 04/28/93–12/30/96 | MC | 783249 | 4501489 | 94 |
| LM00.5M | 29 | 09/24/93–12/31/96 | TRIB | 711723 | 4429191 | 82 |
| LM07.2M | 30 | 01/20/94–12/31/96 | TRIB | 707351 | 4428445 | 78 |
| MK04.4M | 2 | 04/26/93–12/30/96 | TRIB | 776765 | 4491575 | 97 |
| QV04.6M | 12 | 04/26/93–12/30/96 | TRIB | 758620 | 4468071 | 97 |
| S000.2K | 15 | 12/05/90–12/30/96 | TRIB | 748649 | 4465581 | 112 |
| SG16.2C | 28 | 04/10/92–12/31/96 | TRIB | 743373 | 4438599 | 112 |

[a]See Table A-4 for habitat class descriptions.

**Table A-3.** Long Term Resource Monitoring Program fixed-site water quality sampling locations sorted by habitat class with associated period of record from 1993 through 1996, habitat class, Universal Transverse Mercator (UTM) Coordinates (zone 15, meters), and number of sampling visits to the site.

| Location code | Map identification | Period of record | Habitat class[a] | UTM | | Site visits 1993–1996 |
|---|---|---|---|---|---|---|
| | | | | Easting | Northing | |
| I098.0C | 25 | 09/06/89–04/12/93 | BWC | 725466 | 4444200 | 15 |
| I099.4C | 23 | 09/06/89–04/12/93 | BWC | 727389 | 4445489 | 15 |
| I099.4D | 24 | 09/06/89–04/12/93 | BWC | 727389 | 4445436 | 15 |
| I106.5X | 21 | 09/06/89–04/12/93 | BWC | 739042 | 4447352 | 15 |
| I106.5Y | 22 | 09/06/89–04/12/93 | BWC | 739082 | 4447313 | 15 |
| I106.8X | 20 | 10/30/89–04/12/93 | BWC | 739451 | 4447933 | 15 |
| I122.5X | 10 | 09/01/89–04/13/93 | BWC | 750637 | 4468394 | 15 |
| I122.6Y | 11 | 09/01/89–12/30/96 | BWC | 750707 | 4468389 | 111 |
| I109.5D | 17 | 09/12/89–12/31/96 | BWI | 738629 | 4453509 | 85 |
| I124.8R | 9 | 04/25/90–05/25/93 | BWI | 751508 | 4471935 | 16 |
| I127.9W | 8 | 04/25/90–05/25/93 | BWI | 755714 | 4473468 | 16 |
| I128.8T | 7 | 09/05/89–05/25/93 | BWI | 756326 | 4474258 | 16 |
| I129.8W | 5 | 07/01/91–05/25/93 | BWI | 757518 | 4475007 | 16 |
| I135.8W | 3 | 10/19/89–04/15/93 | BWI | 764092 | 4483187 | 15 |
| I135.8X | 4 | 10/19/89–04/15/93 | BWI | 764206 | 4482995 | 15 |
| I080.2C | 31 | 01/20/94–12/31/96 | MC | 710613 | 4423724 | 78 |
| I080.2M | 32 | 04/28/93–12/31/96 | MC | 710757 | 4423711 | 93 |
| I095.2C | 26 | 09/06/89–04/12/93 | MC | 722628 | 4441535 | 15 |
| I107.2R | 18 | 09/06/89–04/12/93 | MC | 738242 | 4448885 | 15 |
| I121.2W | 14 | 09/01/89–12/30/96 | MC | 749108 | 4466765 | 112 |
| I157.8D | 1 | 04/28/93–12/30/96 | MC | 783249 | 4501489 | 94 |
| I094.8D | 27 | 09/06/89–04/12/93 | SC | 722694 | 4441126 | 15 |
| I107.0S | 19 | 09/06/89–04/12/93 | SC | 738347 | 4448554 | 15 |
| I113.0T | 16 | 09/06/89–12/30/96 | SC | 743376 | 4455335 | 111 |
| I121.5X | 13 | 09/01/89–04/13/93 | SC | 749599 | 4466910 | 15 |
| I128.8F | 6 | 08/28/90–05/25/93 | SC | 755668 | 4474868 | 16 |
| LM00.5M | 29 | 09/24/93–12/31/96 | TRIB | 711723 | 4429191 | 82 |
| LM07.2M | 30 | 01/20/94–12/31/96 | TRIB | 707351 | 4428445 | 78 |
| MK04.4M | 2 | 04/26/93–12/30/96 | TRIB | 776765 | 4491575 | 97 |
| QV04.6M | 12 | 04/26/93–12/30/96 | TRIB | 758620 | 4468071 | 97 |
| S000.2K | 15 | 12/05/90–12/30/96 | TRIB | 748649 | 4465581 | 112 |
| SG16.2C | 28 | 04/10/92–12/31/96 | TRIB | 743373 | 4438599 | 112 |

[a]See Table A-4 for habitat class descriptions.

**Table A-4.** Habitat classes used in fixed-site water quality sampling. Previous habitat classes refer to categories used from 1988 through 1993 and are now combined within each of the present habitat classes.

| Present habitat class designator | Previous habitat designators included in present class | Habitat class description |
|---|---|---|
| BWC | BWC, BWC-O, BWC-V | Contiguous backwaters |
| BWI | BWI, BWI-O, BWI-V | Isolated backwaters |
| SC | SC, SCB, SCT, SCU | Side channels |
| IMP | IMP-O, IMP-V | Impounded areas |
| IMP-L | IMP-L | Lakes—Swan or Pepin |
| MC | MC, CTR, CBU, CBW, TW, TWB, TWBU, TWR-O, TWW | Main channel |
| TRIB | TRIB, TRM | Tributary |

**Table A-5.** Abbreviations used to designate fixed-site sampling locations in the Long Term Resource Monitoring Program. Not all streams in this list have been sampled by the Long Term Resource Monitoring Program. The Mackinaw, Spoon, and Sangamon Rivers are all tributaries to the Illinois River. Each site identifier includes the distance (in miles) above the tributary mouth (xx.x) and the relative location (A–Z) of the sampling site between the left and right (facing upstream) limits of the floodplain.

| Site identifier | Tributary name |
|---|---|
| APxx.xM | Apple River, Missouri |
| ALxx.xM | Apple River, Illinois |
| BCxx.xM | Bob's Creek, Missouri |
| BFxx.xM | Buffalo River, Wisconsin |
| BKxx.xM | Black River, Wisconsin |
| BMxx.xM | Big Muddy River, Illinois |
| BXxx.xM | Bad Axe River, Wisconsin |
| CAxx.xM | Cahokia Creek, Illinois |
| CCxx.xM | Coon Creek, Wisconsin |
| CFxx.xM | Catfish Creek, Iowa |
| CHxx.xM | Chippewa River, Wisconsin |
| CNxx.xM | Cannon River, Minnesota |
| CRxx.xM | Cache River, Illinois |
| CUxx.xM | Cuivre River, Missouri |
| DCxx.xM | Dardenne Creek, Missouri |
| DMxx.xM | Des Moines River, Iowa |
| ERxx.xM | Elk River, Iowa |
| HDxx.xM | Headwaters Diversion, Missouri (formerly Little River, LRxx.xM) |
| Ixxx.xZ | Illinois River, Illinois |
| IWxx.xM | Iowa River, Iowa |
| LMxx.xM | LaMoines River, Illinois |
| LRxx.xM | Little River, Missouri (now Headwaters Diversion, HDxx.xM) |

**Table A-5.** Continued.

| Site identifier | Tributary name |
|---|---|
| LXxx.xM | La Crosse River, Wisconsin |
| Mxxx.xZ | Mississippi River (main stem) |
| MCxx.xM | Mill Creek, Iowa |
| MKxx.xM | Mackinaw River, Illinois |
| MOxx.xM | Missouri River, Missouri |
| MQxx.xM | Maquoketa River, Iowa |
| PExx.xM | Peruque Creek, Missouri |
| PIxx.xM | Piasa Creek, Illinois |
| PRxx.xM | Plum River, Illinois |
| QVxx.xM | Quiver Creek, Illinois |
| Rxxx.xM | Root River, Minnesota |
| RCxx.xM | Rush Creek, Illinois |
| Sxxx.xM | Spoon River, Illinois |
| SGxx.xM | Sangamon River, Illinois |
| SKxx.xM | Skunk River, Iowa |
| SXxx.xM | St. Croix River, Minnesota/Wisconsin |
| UIxx.xM | Upper Iowa River, Iowa |
| VMxx.xM | Vermillion River, Minnesota |
| WDxx.xM | Wood River, Illinois |
| WPxx.xM | Wapsipinicon River, Iowa |
| WSxx.xM | Wisconsin River, Wisconsin |
| WWxx.xM | Whitewater River, Minnesota |
| YLxx.xM | Yellow River, Iowa |
| ZMxx.xM | Zumbro River, Minnesota |

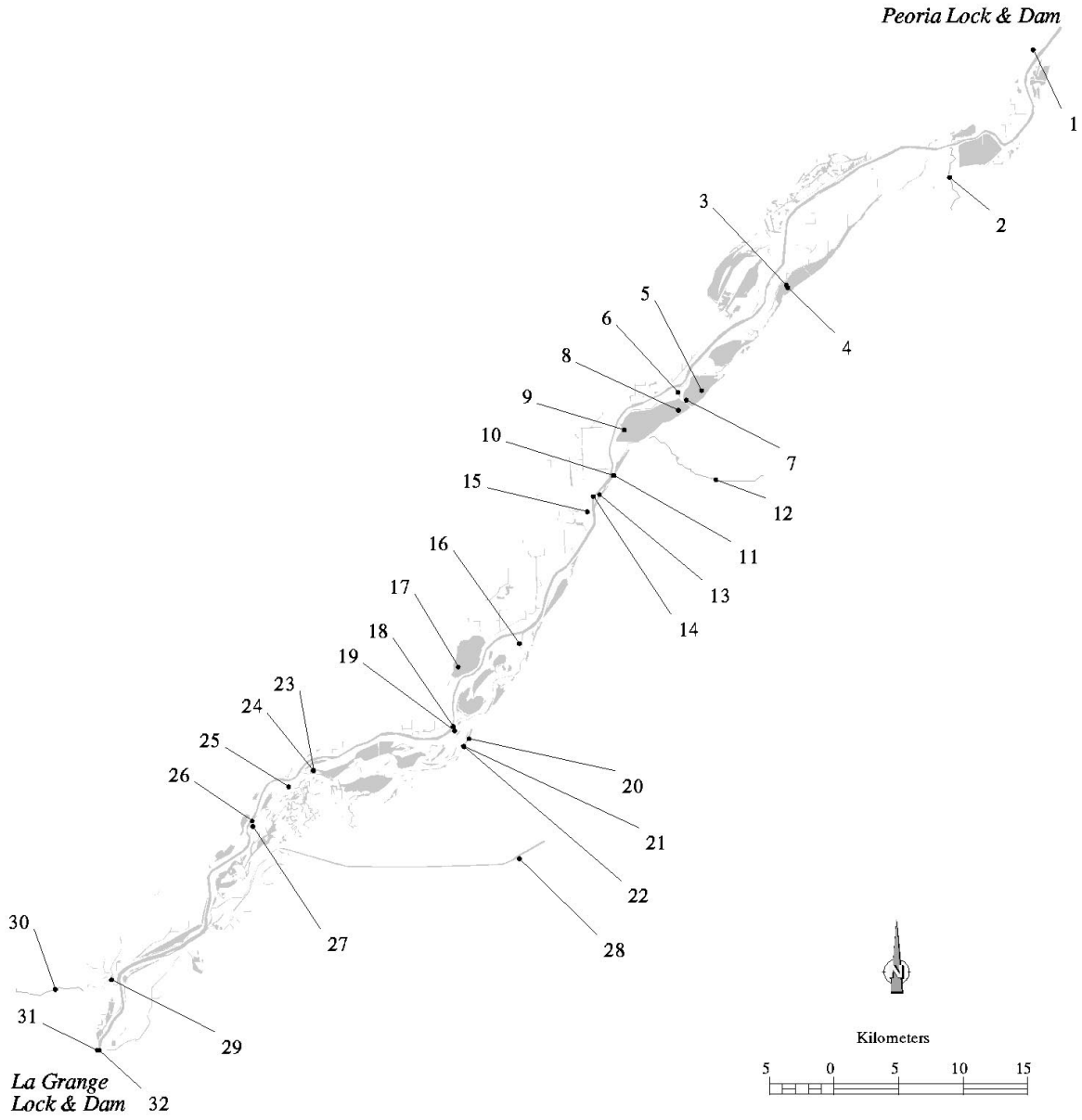


**Figure A-1.** Fixed-site sampling locations in the Havana study area.

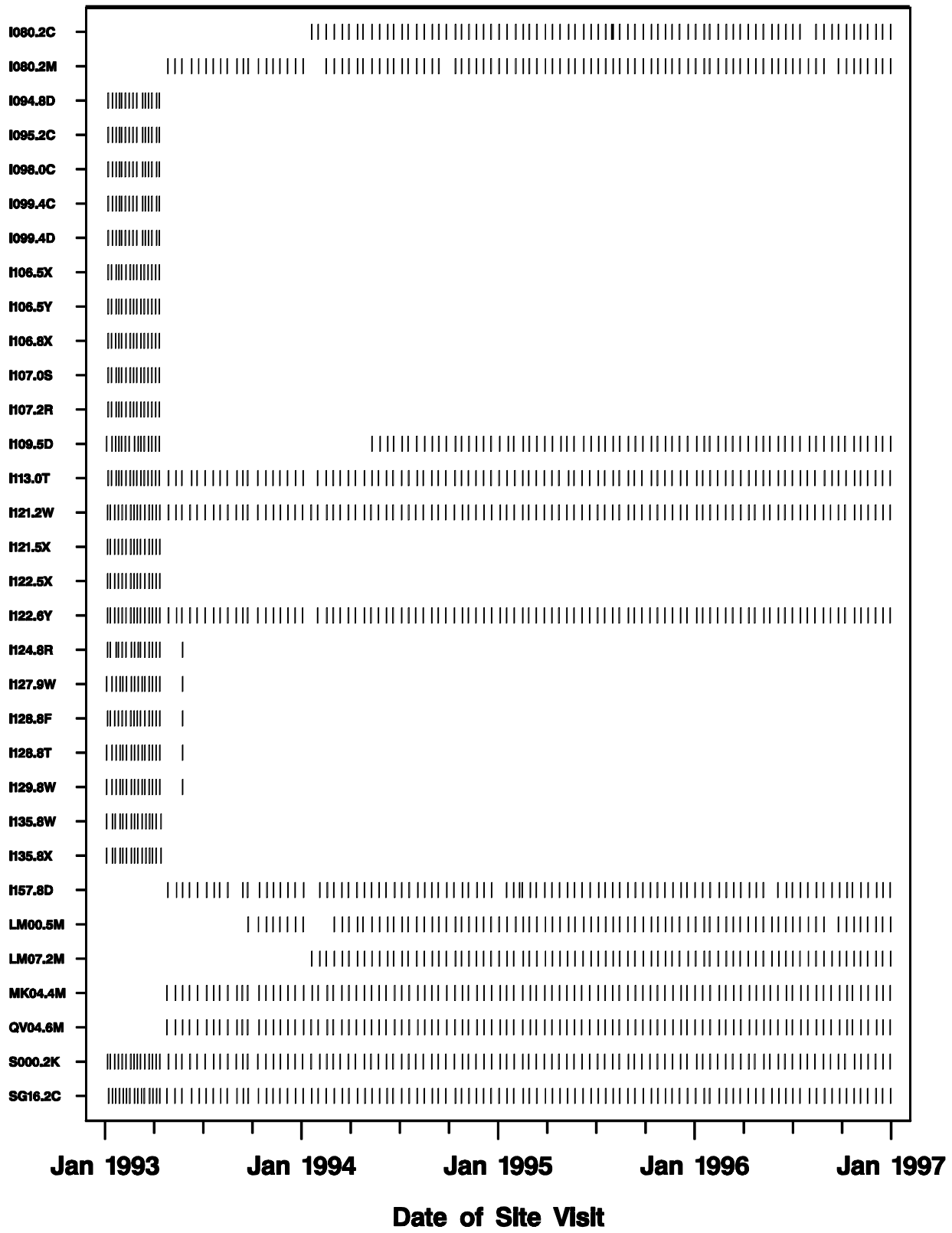


**Figure A-2.** Sampling dates from January 1993 through December 1996 at each of the fixed sites monitored by the Havana Field Station.

## Appendix B. Stratified Random Sampling Sites: January 1993–December 1996

Randomly selected sites are used in stratified random sampling (SRS) to provide an unbiased representation of sampling strata (and entire study areas) within each Long Term Resource Monitoring Program study reach. Individual sites are generally not resampled in subsequent SRS episodes. Information from an individual site is not intended to be interpreted in isolation, as it is only a single random measurement from all the locations within a stratum during a specific episode. When pooled together, multiple measurements (sites) from each stratum provide a statistically reliable sample of the episode and the study reach.

Unlike the fixed-site location maps (Appendix A), the maps provided for SRS do not show the individual sampling locations, but rather the sampling strata within the reach. This approach allows a legible portrayal and deemphasizes the individual identities of SRS locations.

The tables in Appendix B show the allocation of sampling effort across the sampling strata and across the 14 SRS episodes within the 1993–96 period.

**Table B-1.** Sampling strata and design allocation of sampling effort for water quality stratified random sampling in the vicinity of the Havana Field Station. Total area of the study reach is greater than the total area included within the sampling strata due to inaccessible areas that are excluded from sampling.

| Sampling stratum | Area within the stratum (ha) | Fraction of study area within the stratum (%) | Number of potential sampling sites in the stratum[a] | Number of sites assigned | Fraction of stratum sampled (%) | Fraction of total effort (%) |
|---|---|---|---|---|---|---|
| Main channel | 2,492 | 2 | 623 | 35 | 5.6 | 26 |
| Side channel | 140 | 0 | 558 | 20 | 3.6 | 15 |
| Backwater | 1,049 | 1 | 4,197 | 80 | 1.9 | 59 |
| Lake | 0 | 0 | 0 | 0 | 0.0 | 0 |
| Impounded | 0 | 0 | 0 | 0 | 0.0 | 0 |
| Isolated | 0 | 0 | 0 | 0 | 0.0 | 0 |
| Total[b] | 126,211 | 3 | 5,378 | 135 | 2.5 | 100 |

[a]Total potential sites reflect a 200-m grid in most strata but a 50-m grid in side channels and backwaters.
[b]Total area refers to the entire pool or study reach and is greater than the sum of areas within the sampling strata.

**Table B-2.** Sampling dates and sampling activity of the Havana Field Station in each stratified random sampling episode from 1993 through 1996.

| Sampling period | | | Number of samples collected/sites visited | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Episode | Start date | End date | Total | Main channel | Side channel | Contiguous backwater | Lake | Impoundment | Isolated |
| Summer 93 | 07/12/93 | 07/21/93 | 227/130 | 36/35 | 41/20 | 150/75 | — | — | — |
| Fall 93 | 10/18/93 | 10/28/93 | 233/134 | 35/35 | 40/20 | 158/79 | — | — | — |
| Winter 94 | 01/24/94 | 02/26/94 | 166/98 | 20/19 | 40/20 | 106/59 | — | — | — |
| Spring 94 | 04/25/94 | 05/04/94 | 230/132 | 36/35 | 40/20 | 154/77 | — | — | — |
| Summer 94 | 07/25/94 | 08/01/94 | 164/120 | 35/35 | 36/20 | 93/65 | — | — | — |
| Fall 94 | 10/11/94 | 10/19/94 | 111/89 | 36/35 | 29/18 | 46/36 | — | — | — |
| Winter 95 | 01/31/95 | 02/10/95 | 211/122 | 30/30 | 39/20 | 142/72 | — | — | — |
| Spring 95 | 04/25/95 | 05/04/95 | 233/135 | 35/35 | 39/20 | 159/80 | — | — | — |
| Summer 95 | 07/24/95 | 07/28/95 | 176/133 | 35/35 | 33/20 | 108/78 | — | — | — |
| Fall 95 | 10/10/95 | 10/18/95 | 134/97 | 35/35 | 32/19 | 67/43 | — | — | — |
| Winter 96 | 01/30/96 | 02/15/96 | 111/83 | 23/23 | 30/17 | 58/43 | — | — | — |
| Spring 96 | 04/22/96 | 05/07/96 | 183/134 | 35/35 | 38/20 | 110/79 | — | — | — |
| Summer 96 | 07/22/96 | 07/31/96 | 233/135 | 35/35 | 36/20 | 162/80 | — | — | — |

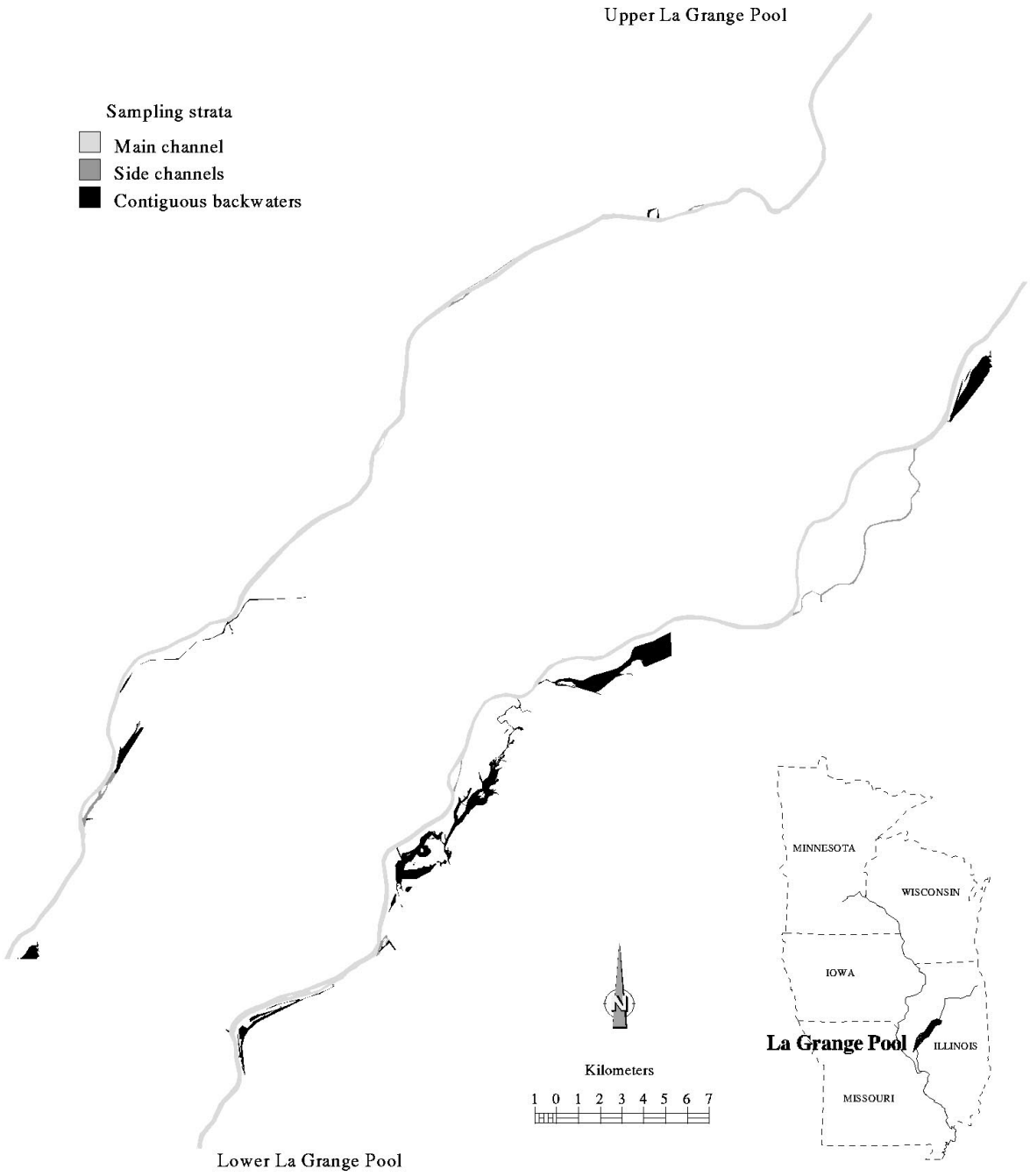


**Figure B-1.** Long Term Resource Monitoring Program sampling strata used in water quality stratified random sampling in the vicinity of the Havana Field Station.

# Appendix C. Limnological Parameters Measured in the Long Term Resource Monitoring Program

**Table C-1.** Period of record for limnological measurements (laboratory and in situ) performed by Long Term Resource Monitoring Program field teams from 1988 through 1996.

| Parameter | 1988 | 1989 | 1990 | 1991 | 1992 | 1993–1996 |
|---|---|---|---|---|---|---|
| Water temperature | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |
| Dissolved oxygen | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |
| Conductivity | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |
| pH | | | | June ■ | ■■■■■ | ■■■■■ |
| Turbidity | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |
| Secchi depth | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |
| Total suspended solids | | | | ■■■■■ | ■■■■■ | ■■■■■ |
| Volatile suspended solids | | | | ■■■■■ | ■■■■■ | ■■■■■ |
| Chlorophyll *a* | | | | June ■ | ■■■■■ | ■■■■■ |
| Total phosphorus | | | | June ■ | ■■■■■ | ■■■■■ |
| Soluble reactive phosphorus | | | | June ■ | ■■■■■ | ■■■■■ |
| Total soluble phosphorus | | | | June ■ | ■■■■■ | ■■ Apr 93 |
| Total nitrogen | | | | June ■ | ■■■■■ | ■■■■■ |
| Total soluble nitrogen | | | | June ■ | ■■■■■ | ■■ Apr 93 |
| $NO_x$ (nitrate–nitrite) | | | | June ■ | ■■■■■ | ■■■■■ |
| $NH_x$ (ammonium) | | | | June ■ | ■■■■■ | ■■■■■ |
| Si (silicate) | | | | June ■ | ■■■■■ | ■■■■■ |
| Cl (chloride) | | | | June ■ | ■■■■■ | ■■■■■ |
| Ca (calcium) | | | | June ■ | ■■■■■ | ■■■■■ |
| Mg (magnesium) | | | | June ■ | ■■■■■ | ■■■■■ |
| Na (sodium) | | | | June ■ | ■■■■■ | ■■■■■ |
| K (potassium) | | | | June ■ | ■■■■■ | ■■■■■ |
| Fe (iron) | | | | June ■ | ■■■■■ | ■■ Feb 93 |
| Mn (manganese) | | | | June ■ | ■■■■■ | ■■ Feb 93 |
| Ice and snow | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |
| Water depth | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |
| Water velocity | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |

**Table C-2.** Laboratory measurements performed on limnological samples from 1988 through 1996. Each laboratory processed samples or parameters between the dates listed. The precision of result reporting is shown in parentheses. Analytical techniques are described in the procedures manuals for the Waterways Experiment Station (WES) Environmental Laboratories and by the American Public Health Association et al. (1992).

| | Laboratory | | |
|---|---|---|---|
| **Parameter and method** | **WES–Vicksburg** | **WES–Eau Galle** | **UMESC[a]** |
| **Total suspended solids:** Gravimetric/105° C | — | June 91–June 93 (1 µg/L) | June 93–Present (1 µg/L) |
| **Volatile suspended solids:** Gravimetric/550° C | — | June 91–June 93 (1 µg/L) | June 93–Present (1 µg/L) |
| **Chlorophyll *a*:** Fluorometric-DMSO-acetone extraction | — | — | June 93–Present (1 µg/L) |
| **Chlorophyll *a*:** Spectrophotometric 90% acetone extraction | — | June 91–June 93 (1 µg/L) | June 93–Present (1 µg/L) |
| **Total phosphorus:** Automated/ persulfate/ascorbic acid | — | June 91–Jan. 94 (1 µg/L) | Jan. 94–Present (1 µg/L) |
| **Soluble reactive phosphorus (H):** Automated/ $H_2SO_4$ preservation, ascorbic acid | June 91–Dec. 93 (1 µg/L) | — | — |
| **Soluble reactive phosphorus:** Automated /frozen/ascorbic acid | Jan. 94–Feb. 94 (1 µg/L) | — | Feb. 94–Present (1 µg/L) |
| **Total soluble phosphorus:** Automated/persulfate/ascorbic acid | — | June 91–Apr. 93 (1 µg/L) | — |
| **Total nitrogen:** Automated/Devarda's alloy | — | June 91–Jan. 94 (0.01 mg/L) | Jan. 94–Present (0.01 mg/L) |
| **Total soluble nitrogen:** Automated/Devarda's alloy | — | June 91–Apr. 93 (0.01 mg/L) | – |
| **Nitrate–nitrite nitrogen:** Automated Cd reduction, ion chromatography | June 91–Apr. 94 Automated Cd Reduction (0.01 mg/L) | — | Apr.–June 94: Cd reduction June 94–Present: Ion C. (0.01 mg/L) |
| **$NH_x$:** Automated salicylate | June 91–Feb. 94 (1 µg/L) | — | Feb. 94–Present (1 µg/L) |
| **Dissolved silicate silica:** Automated/molybdate | June 91–Feb. 94 (0.01 mg/L) | — | Mar. 94–Present (0.01 mg/L) |
| **$SO_4$:** Ion chromatography | — | — | Jan. 94–Present (0.1 mg/L) |
| **Dissolved chloride:** Automated ferro-cyanide, ion chromatography | June 91–June 94: Automated FeCN (0.1 mg/L) | — | June 94–Present: IC (0.1 mg/L) |
| **Dissolved calcium:** Ion chromatography | — | — | Jan. 94–Present (0.1 mg/L) |
| **Dissolved calcium:** Atomic absorption | June 91–Oct. 93 (0.1 mg/L) | — | Oct. 93–Jan. 94 (0.1 mg/L) |

**Table C-2.** Continued.

| Parameter and method | Laboratory | | |
|---|---|---|---|
| | WES–Vicksburg | WES–Eau Galle | UMESC[a] |
| **Dissolved magnesium:** Ion chromatography | | | Jan 94–Present (0.1 mg/L) |
| **Dissolved sodium:** Ion chromatography | | | Jan. 94–Present (0.1 mg/L) |
| **Dissolved potassium:** Atomic absorption | June 91–Oct. 93 (0.1 mg/L) | — | Oct. 93–Present (0.1 mg/L) |
| **Dissolved iron:** Atomic absorption | June 91–Apr. 93 (0.01 mg/L) | — | — |
| **Dissolved manganese:** Atomic absorption | June 91–Apr. 93 (0.01 mg/L) | — | — |

[a]Upper Midwest Environmental Sciences Center

# Appendix D. Water Quality Sample Collection

Details of sample collection are important to ensure that field activities comply with the monitoring design and are producing unbiased results. The figures in Appendix D focus on site visits and sample collection times. Consistent differences in sampling times among sites, over time, or among field stations can introduce serious bias into measurements influenced by daily cycles (e.g., temperature and dissolved oxygen). Gaps in the data record can also have important ramifications for data interpretation and are therefore documented here.

**Table D-1.** Fixed-site sampling visit exceptions from 1993 through 1996 at the Havana Field Station. Table entries are keyed to numbered points on Figure D-1.

| Figure code | Begin date | Site visits | Comment |
|---|---|---|---|
| 1 | 01/08/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 2 | 01/15/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 3 | 01/22/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 4 | 01/29/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 5 | 02/05/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 6 | 02/12/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 7 | 02/19/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 8 | 02/26/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 9 | 03/05/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 10 | 03/12/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 11 | 03/19/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 12 | 03/26/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 13 | 04/02/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 14 | 04/09/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 15 | 04/16/93 | 25 | Weekly sampling of 25 sites before network redesign |
| 16 | 10/04/93 | 0 | Schedule shifted to alternate week |
| 17 | 02/10/95 | 1 | Unsafe ice conditions |

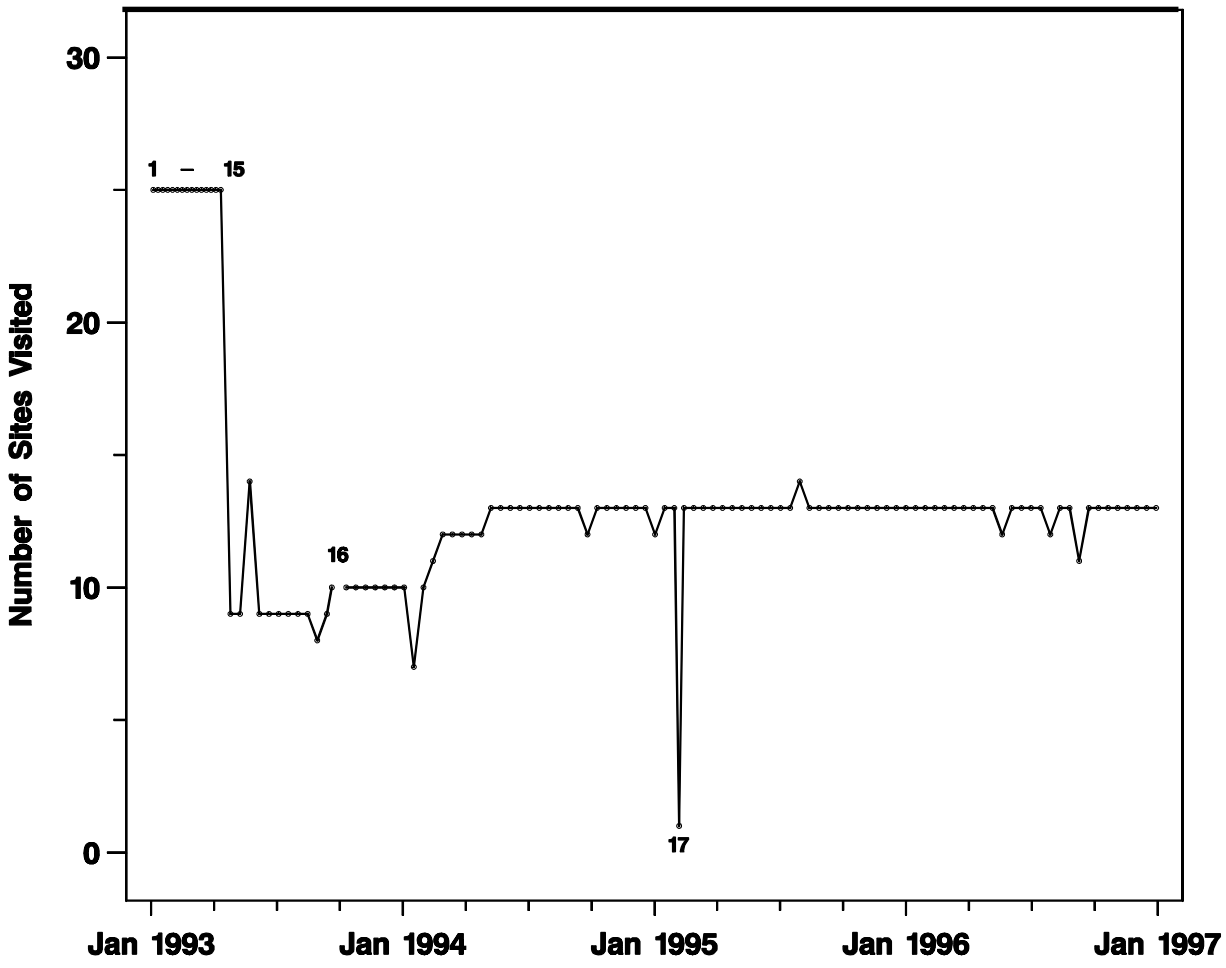


**Figure D-1.** Number of weekly fixed-site visits from January 1993 through December 1996 by the Havana Field Station. Numbered points are weeks that differ by more than one standard deviation from the mean site visits per week and are described in Table D-1.

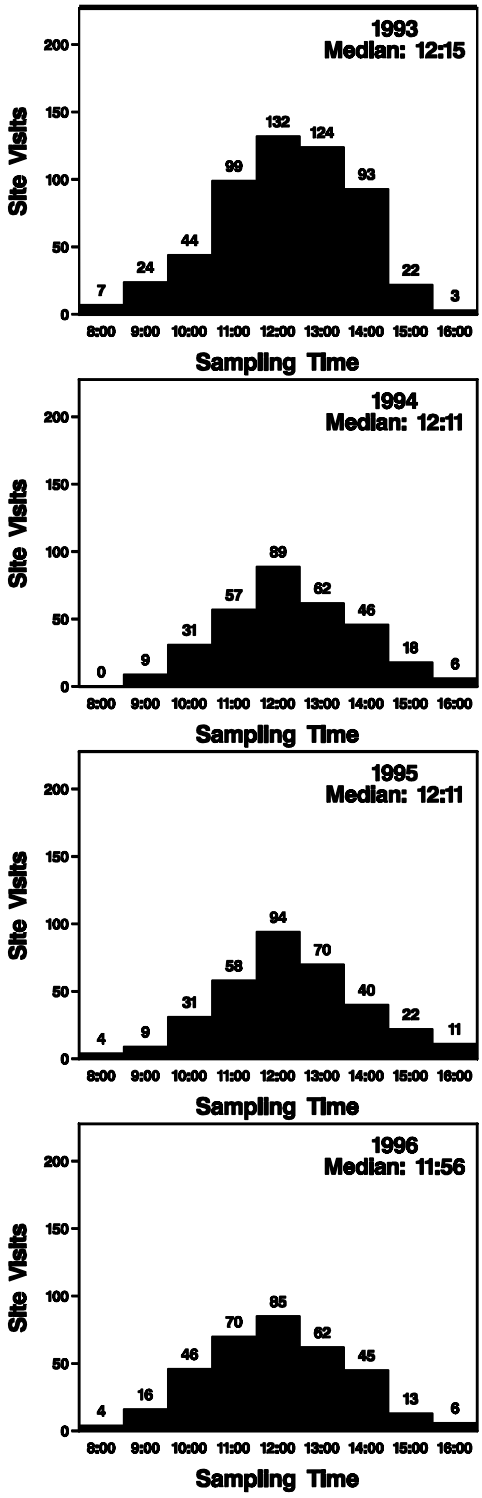


**Figure D-2.** Distribution of sample collection times at fixed sites from 1993 through 1996. Each bar is labeled with the number of site visits within each hourly interval.

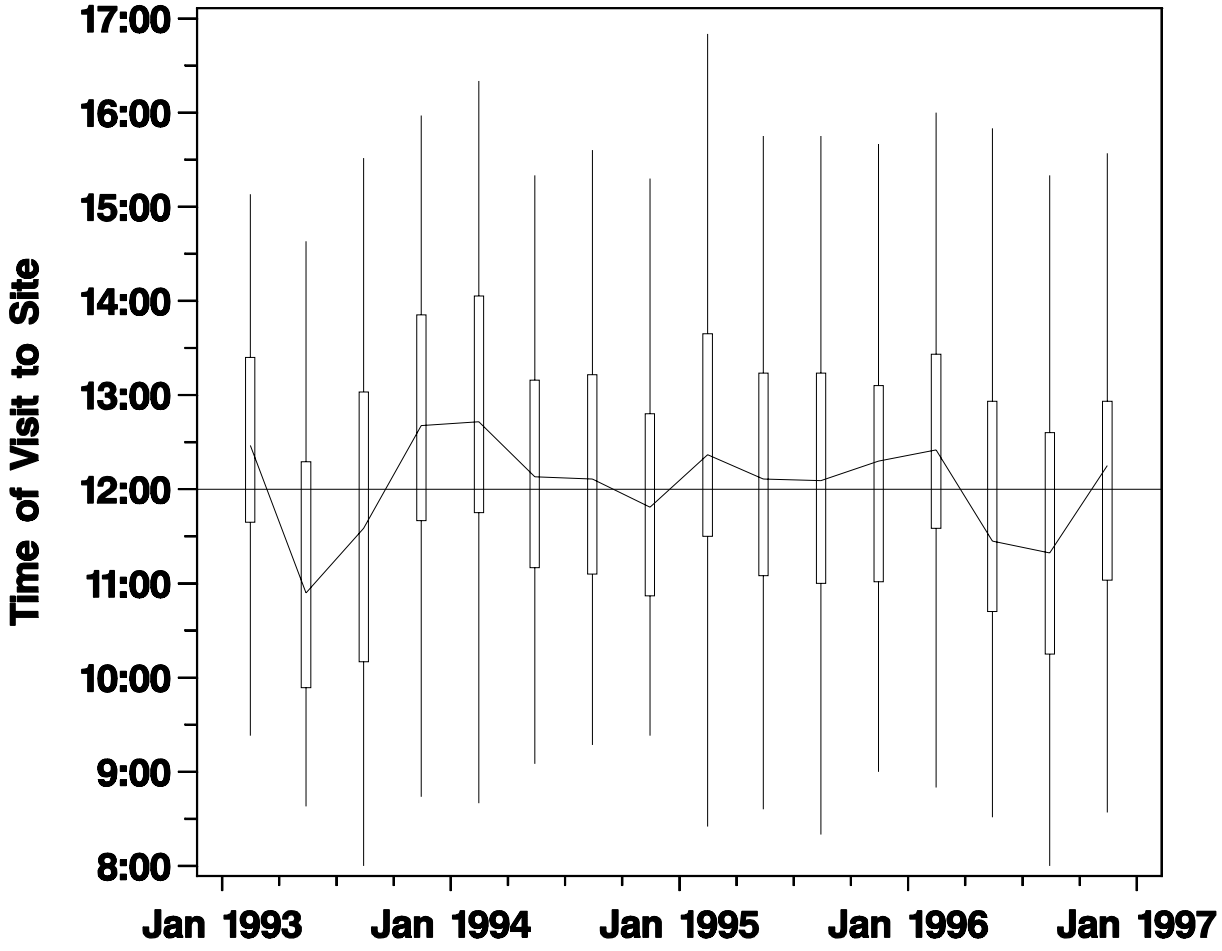


**Figure D-3.** Trend in fixed-site sample collection times by quarter, from 1993 through 1996. The midpoint (median) for each quarter is joined by a solid line. The box extending above and below the median denotes the 90th and 10th percentiles, respectively. The vertical line extends above and below the box to the maximum and minimum values for the quarter.

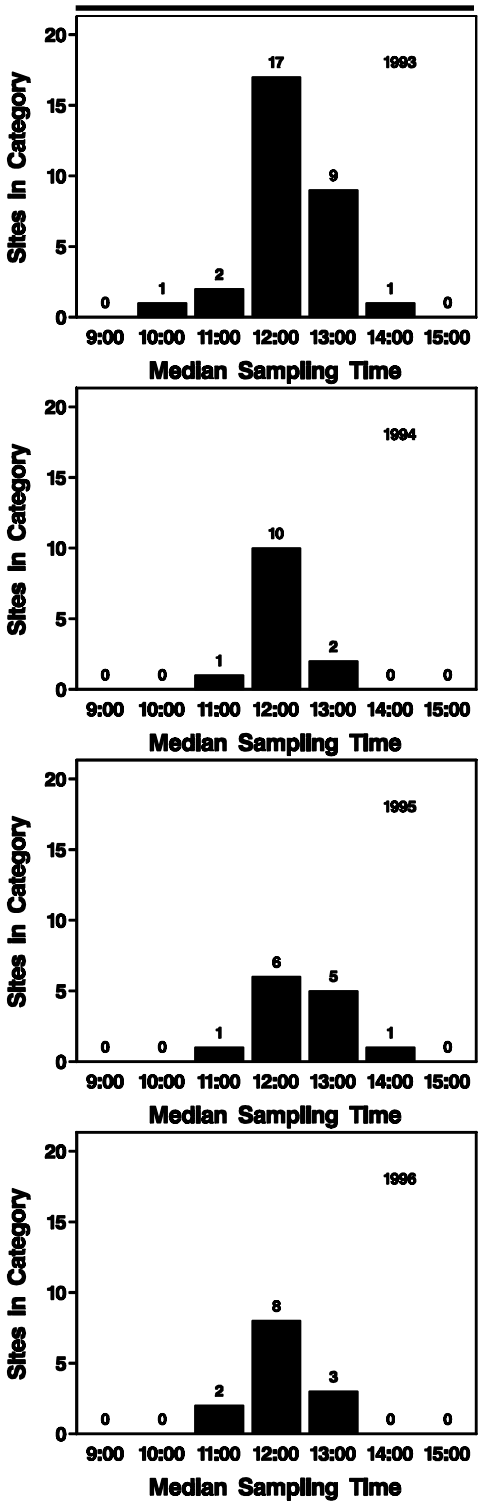


**Figure D-4.** Distribution of fixed sites by median sampling time at each site from 1993 through 1996.

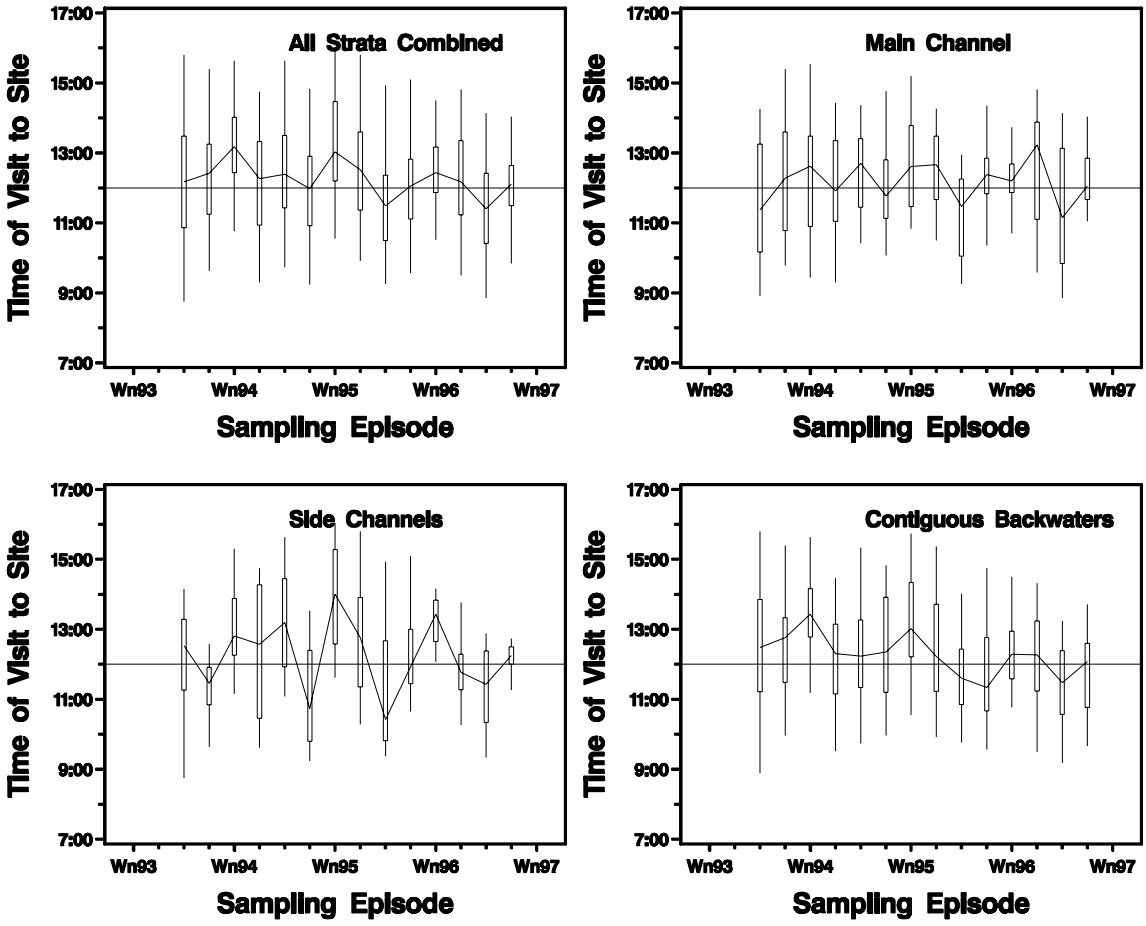


**Figure D-5.** Water quality sample collection times in each sampling stratum during each episode of stratified random sampling from 1993 through 1996. The midpoints (median) of the episodes are joined by a solid line. The box extending above and below the median denotes the 90th and 10th percentiles, respectively. The vertical line extends above and below each box to the maximum and minimum values for the episode.

# Appendix E. Fixed-site Sampling Data: January 1993–December 1996

In Appendix E, we summarize the fixed-site monitoring data in both tabular and graphic forms. The tables contain annual statistics for each fixed site divided into two parameter groups: (1) physical and biological measurements (Table E-1), and (2) chemical data (major anions, cations, and plant nutrients; Table E-2). Within each parameter group, the data are divided by sampling depth into three groups (surface, middepth, and bottom). Chemical measurements are typically collected only at the surface and near the bottom. The majority of all measurement are in the near-surface category. Refer to Appendix A for descriptions and locations of the individual sampling sites. Sites with less than five visits during the 1993–96 period are excluded from these summaries.

The figures (E-1 and E-2) of the fixed-site data are in two formats. For sampling on the Mississippi (or Illinois) River main stems, the figures generally include separate plots of monthly means from main channel and impounded sites near the upstream and downstream ends of the reach or pool (where available). For tributary sampling, only a single plot is provided. Unlike the summary tables, these figures combine data from all sampling depths.

Data that have been flagged as questionable in the Long Term Resource Monitoring Program database are excluded from this summary. Values that are below detection are indicated by the detection limit preceded by a negative sign. Below-detection values are included in the determination of minima, maxima, and medians, but in the calculation of means and standard deviations, values below detection have been replaced by a value equal to half the detection limit. The Secchi transparency data in this report do not include observations where Secchi transparency exceeded the water column depth. High transparency conditions are thus underrepresented.

**Table E-1**. Annual summaries (1993–1996) of physical measurements at fixed sites grouped into four categories: (1) near-surface (less than or equal to 0.2 m below the surface), (2) middepth, (3) near bottom (less than or equal to 0.2 m above the substrate), and (4) miscellaneous depths.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I080.2M | Mean | 0.2 | 7.33 | 1.11 | — | — | — | — | 17.9 | 7.79 | 79 | 550 | 8.2 | 30.4 | 59 | 74.4 | 10.9 | — | — |
| | Median | 0.2 | 7.15 | 1.11 | — | — | — | — | 20.2 | 7.45 | 78 | 563 | 8.2 | 31 | 40 | 54.2 | 9.7 | — | — |
| | Minimum | 0.2 | 5.8 | 1.11 | — | — | — | — | 4 | 4.3 | 52 | 422 | 6.1 | 11 | 21 | 17.9 | 4.2 | — | — |
| | Maximum | 0.2 | 9.1 | 1.11 | — | — | — | — | 27 | 12.6 | 121 | 649 | 9.5 | 50 | 225 | 338 | 32.4 | — | — |
| | Std. dev. | 0 | 1.04 | — | — | — | — | — | 8.28 | 2.55 | 17 | 67 | 0.77 | 12.2 | 52.4 | 77.4 | 7.04 | — | — |
| | *N* obs. | 18 | 18 | 1 | 0 | 0 | 0 | 0 | 18 | 18 | 18 | 18 | 17 | 18 | 18 | 15 | 15 | 0 | 0 |
| I094.8D | Mean | 0.2 | 3.85 | 0.37 | — | — | — | — | 2.96 | 12 | 89 | 737 | 8.1 | 26.4 | 55 | — | — | — | — |
| | Median | 0.2 | 4.1 | 0.37 | — | — | — | — | 1.6 | 12.5 | 89 | 751 | 8.1 | 22 | 43 | — | — | — | — |
| | Minimum | 0.2 | 1.8 | 0.29 | — | — | — | — | 0.1 | 8.7 | 79 | 600 | 7.2 | 15 | 24 | — | — | — | — |
| | Maximum | 0.2 | 5 | 0.5 | — | — | — | — | 11 | 14 | 99 | 952 | 9.1 | 45 | 145 | — | — | — | — |
| | Std. dev. | 0 | 0.92 | 0.07 | — | — | — | — | 3.4 | 1.41 | 4.89 | 114 | 0.45 | 9.7 | 36.1 | — | — | — | — |
| | *N* obs. | 15 | 14 | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 |
| I095.2C | Mean | 0.2 | 4.53 | 0.41 | — | — | — | — | 2.9 | 12.1 | 89 | 729 | 8 | 26.9 | 55 | — | — | — | — |
| | Median | 0.2 | 4.6 | 0.41 | — | — | — | — | 1.3 | 12.4 | 91 | 758 | 8.1 | 25.5 | 47 | — | — | — | — |
| | Minimum | 0.2 | 1.5 | 0.26 | — | — | — | — | 0.2 | 8.5 | 77 | 578 | 7.4 | 16 | 27 | — | — | — | — |
| | Maximum | 0.2 | 7 | 0.72 | — | — | — | — | 10.9 | 14 | 99 | 932 | 8.7 | 40 | 142 | — | — | — | — |
| | Std. dev. | 0 | 1.72 | 0.12 | — | — | — | — | 3.33 | 1.49 | 5.53 | 112 | 0.36 | 7.77 | 30.5 | — | — | — | — |
| | *N* obs. | 15 | 14 | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 |
| I098.0C | Mean | 0.2 | 3.34 | 0.19 | — | — | — | — | 3.15 | 11.9 | 88 | 739 | 8.2 | 28.7 | 47 | — | — | — | — |
| | Median | 0.2 | 4 | 0.13 | — | — | — | — | 1.3 | 12.2 | 88 | 726 | 8.1 | 28 | 43 | — | — | — | — |
| | Minimum | 0.2 | 1 | 0.09 | — | — | — | — | 0.3 | 8.6 | 78 | 603 | 7.2 | 19 | 25 | — | — | — | — |
| | Maximum | 0.2 | 4.1 | 0.58 | — | — | — | — | 11 | 14.4 | 102 | 932 | 9 | 40 | 82 | — | — | — | — |
| | Std. dev. | 0 | 1 | 0.15 | — | — | — | — | 3.48 | 1.47 | 5.85 | 109 | 0.47 | 7.84 | 17.8 | — | — | — | — |
| | *N* obs. | 14 | 13 | 13 | 0 | 0 | 0 | 0 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 0 | 0 | 0 | 0 |
| I099.4C | Mean | 0.2 | 2.89 | 0.21 | — | — | — | — | 3.16 | 12.4 | 92 | 728 | 8.1 | 31.5 | 39 | — | — | — | — |
| | Median | 0.2 | 3.2 | 0.21 | — | — | — | — | 1.5 | 12.5 | 88 | 752 | 8.2 | 34 | 36 | — | — | — | — |
| | Minimum | 0.2 | 0.6 | 0.07 | — | — | — | — | 1 | 8.8 | 80 | 593 | 7.3 | 17 | 19 | — | — | — | — |
| | Maximum | 0.2 | 3.9 | 0.34 | — | — | — | — | 11 | 18.6 | 134 | 924 | 8.8 | 55 | 96 | — | — | — | — |
| | Std. dev. | 0 | 0.98 | 0.09 | — | — | — | — | 3.39 | 2.29 | 13.4 | 109 | 0.4 | 11.6 | 19.4 | — | — | — | — |
| | *N* obs. | 14 | 13 | 13 | 0 | 0 | 0 | 0 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 0 | 0 | 0 | 0 |
| I099.4D | Mean | 0.2 | 3.15 | 0.26 | — | — | — | — | 3.05 | 12.2 | 90 | 708 | 8.1 | 30.2 | 41 | — | — | — | — |
| | Median | 0.2 | 3.5 | 0.27 | — | — | — | — | 1.4 | 12.4 | 89 | 655 | 8.2 | 27 | 41 | — | — | — | — |
| | Minimum | 0.2 | 0.7 | 0.09 | — | — | — | — | 0.5 | 8.8 | 80 | 603 | 7.5 | 17 | 20 | — | — | — | — |
| | Maximum | 0.2 | 4 | 0.35 | — | — | — | — | 10.9 | 15.2 | 107 | 912 | 9.3 | 50 | 88 | — | — | — | — |
| | Std. dev. | 0 | 1.03 | 0.07 | — | — | — | — | 3.42 | 1.61 | 6.43 | 108 | 0.45 | 9.9 | 17.6 | — | — | — | — |
| | *N* obs. | 14 | 13 | 13 | 0 | 0 | 0 | 0 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I106.5X | Mean | 0.2 | 3.1 | 0.24 | 100 | 7 | — | — | 3.42 | 12.3 | 92 | 706 | 8.2 | 33.1 | 42 | — | — | — | — |
| | Median | 0.2 | 3.55 | 0.29 | 100 | 8 | — | — | 1.9 | 12.5 | 89 | 669 | 8.1 | 32 | 35 | — | — | — | — |
| | Minimum | 0.2 | 0.69 | 0.01 | 100 | 3 | — | — | 0.6 | 8.8 | 79 | 540 | 7.8 | 14 | 12 | — | — | — | — |
| | Maximum | 0.2 | 4.5 | 0.46 | 100 | 10 | — | — | 10.5 | 16 | 120 | 920 | 9 | 58 | 118 | — | — | — | — |
| | Std. dev. | 0 | 1.05 | 0.15 | 0 | 3.61 | — | — | 3.19 | 1.75 | 11.1 | 120 | 0.36 | 13.6 | 29.9 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | 3 | 3 | 0 | 0 | 14 | 14 | 14 | 14 | 13 | 14 | 14 | 0 | 0 | 0 | 0 |
| I106.5Y | Mean | 0.2 | 2.91 | 0.2 | 60 | 4 | — | — | 3.56 | 12.2 | 92 | 704 | 8.2 | 32.2 | 42 | — | — | — | — |
| | Median | 0.2 | 3.4 | 0.21 | 50 | 3 | — | — | 2 | 12.4 | 89 | 673 | 8.1 | 30 | 40 | — | — | — | — |
| | Minimum | 0.2 | 0.58 | 0 | 30 | 3 | — | — | 0.6 | 8.8 | 79 | 508 | 7.6 | 14 | 14 | — | — | — | — |
| | Maximum | 0.2 | 4.2 | 0.42 | 100 | 5 | — | — | 10.8 | 16 | 120 | 913 | 8.9 | 62 | 99 | — | — | — | — |
| | Std. dev. | 0 | 1.07 | 0.13 | 36.1 | 1.15 | — | — | 3.31 | 1.69 | 10.8 | 124 | 0.36 | 14.6 | 22.3 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | 3 | 3 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 |
| I106.8X | Mean | 0.2 | 3.69 | 0.26 | 100 | 2 | — | — | 3.16 | 11.7 | 87 | 702 | 8.2 | 30.7 | 44 | — | — | — | — |
| | Median | 0.2 | 4 | 0.31 | 100 | 2 | — | — | 1.45 | 12.2 | 88 | 653 | 8.1 | 29 | 39 | — | — | — | — |
| | Minimum | 0.2 | 1 | 0 | 100 | 2 | — | — | 0 | 9 | 81 | 570 | 7.7 | 15 | 17 | — | — | — | — |
| | Maximum | 0.2 | 4.9 | 0.49 | 100 | 2 | — | — | 10.9 | 12.6 | 93 | 913 | 9.1 | 55 | 107 | — | — | — | — |
| | Std. dev. | 0 | 0.95 | 0.16 | — | — | — | — | 3.38 | 1.16 | 3.4 | 120 | 0.38 | 11.4 | 23 | — | — | — | — |
| | *N* obs. | 15 | 14 | 14 | 1 | 1 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 |
| I107.0S | Mean | 0.2 | 4.95 | 0.36 | — | — | — | — | 2.67 | 12.3 | 90 | 738 | 8.2 | 29.3 | 45 | 47.9 | 11.3 | 2.41 | — |
| | Median | 0.2 | 5.3 | 0.35 | — | — | — | — | 1.1 | 12.6 | 90 | 738 | 8 | 30 | 42 | 51.3 | 13.6 | 3.34 | — |
| | Minimum | 0.2 | 2.5 | 0.28 | — | — | — | — | 0.1 | 8.8 | 80 | 586 | 7.4 | 15 | 23 | 17 | 3.2 | -1 | — |
| | Maximum | 0.2 | 7 | 0.46 | — | — | — | — | 10.9 | 14.3 | 104 | 903 | 9 | 48 | 102 | 75.3 | 17.1 | 4.9 | — |
| | Std. dev. | 0 | 1.35 | 0.06 | — | — | — | — | 3.4 | 1.45 | 5.84 | 109 | 0.42 | 9.56 | 19.8 | 29.3 | 7.23 | 3.06 | — |
| | *N* obs. | 15 | 15 | 15 | 0 | 0 | 0 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 3 | 3 | 3 | 0 |
| I107.2R | Mean | 0.2 | 4.97 | 0.3 | — | — | — | — | 2.71 | 12.4 | 91 | 748 | 8.2 | 29.3 | 46 | 47 | 7.1 | 3.92 | — |
| | Median | 0.2 | 5 | 0.25 | — | — | — | — | 1.2 | 12.8 | 89 | 731 | 8.1 | 28 | 42 | 33.4 | 4.4 | 3.74 | — |
| | Minimum | 0.2 | 1.7 | 0.16 | — | — | — | — | 0 | 8.6 | 78 | 595 | 7.3 | 15 | 27 | 30.5 | 4.1 | 2.67 | — |
| | Maximum | 0.2 | 7.2 | 0.62 | — | — | — | — | 10.8 | 15.6 | 110 | 932 | 9 | 48 | 108 | 77.1 | 12.9 | 5.35 | — |
| | Std. dev. | 0 | 1.81 | 0.13 | — | — | — | — | 3.36 | 1.75 | 7.98 | 107 | 0.43 | 9.93 | 19.9 | 26.1 | 5 | 1.35 | — |
| | *N* obs. | 15 | 15 | 14 | 0 | 0 | 0 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 3 | 3 | 3 | 0 |
| I109.5D | Mean | 0.2 | 2.58 | 0.03 | 96.7 | 10 | — | — | 3.15 | 12.8 | 95 | 641 | 8.3 | 36.5 | 40 | — | — | — | — |
| | Median | 0.2 | 2.84 | 0.02 | 100 | 10 | — | — | 1.65 | 12.1 | 87 | 624 | 8.1 | 36.5 | 30 | — | — | — | — |
| | Minimum | 0.2 | 1.44 | 0 | 90 | 6 | — | — | 0.2 | 9.3 | 82 | 434 | 7.4 | 13 | 16 | — | — | — | — |
| | Maximum | 0.2 | 3.59 | 0.1 | 100 | 15 | — | — | 11.3 | 21 | 154 | 897 | 9.3 | 60 | 105 | — | — | — | — |
| | Std. dev. | 0 | 0.65 | 0.03 | 5.16 | 2.99 | — | — | 3.52 | 3.03 | 19.9 | 120 | 0.52 | 16.5 | 28.9 | — | — | — | — |
| | *N* obs. | 15 | 14 | 14 | 6 | 6 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I113.0T | Mean | 0.2 | 5.73 | 0.56 | — | — | — | — | 11 | 10 | 86 | 655 | 8.3 | 27.8 | 60 | 94.9 | 12.3 | — | — |
| | Median | 0.2 | 6 | 0.56 | — | — | — | — | 6.2 | 11 | 87 | 632 | 8.1 | 28 | 50 | 59.4 | 9.3 | — | — |
| | Minimum | 0.2 | 2.6 | 0.19 | — | — | — | — | 0.1 | 4.6 | 59 | 456 | 7.2 | 10 | 25 | 28.9 | 5.3 | — | — |
| | Maximum | 0.2 | 7.9 | 0.98 | — | — | — | — | 27.2 | 14 | 109 | 900 | 9.7 | 48 | 200 | 314 | 31 | — | — |
| | Std. dev. | 0 | 1.28 | 0.19 | — | — | — | — | 10.1 | 2.95 | 10 | 114 | 0.64 | 10.7 | 41.4 | 81.8 | 7.12 | — | — |
| | *N* obs. | 33 | 33 | 32 | 0 | 0 | 0 | 0 | 33 | 33 | 33 | 33 | 32 | 33 | 33 | 15 | 15 | 0 | 0 |
| I121.2W | Mean | 0.2 | 5.63 | 0.49 | 60 | 7 | — | — | 11 | 10.1 | 87 | 653 | 8.2 | 26.9 | 61 | 55.6 | 9.6 | 3.91 | — |
| | Median | 0.2 | 5.7 | 0.51 | 60 | 7 | — | — | 6.1 | 11.6 | 88 | 642 | 8.3 | 27 | 52 | 58.2 | 9.8 | 3.47 | — |
| | Minimum | 0.2 | 2.8 | 0.33 | 60 | 3 | — | — | 0 | 5 | 64 | 453 | 7.4 | 10 | 24 | 23 | 3.4 | 1.78 | — |
| | Maximum | 0.2 | 8.2 | 0.74 | 60 | 10 | — | — | 27.2 | 14.2 | 111 | 936 | 9.7 | 50 | 180 | 92.1 | 15.7 | 6.49 | — |
| | Std. dev. | 0 | 1.31 | 0.14 | 0 | 4.95 | — | — | 10 | 2.88 | 9.82 | 114 | 0.48 | 10.2 | 35.6 | 22.1 | 3.64 | 2.39 | — |
| | *N* obs. | 33 | 33 | 15 | 2 | 2 | 0 | 0 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 19 | 19 | 3 | 0 |
| I121.5X | Mean | 0.2 | 4.54 | 0.41 | 100 | 15 | — | — | 2.76 | 12.3 | 90 | 737 | 8.2 | 24.3 | 62 | — | — | — | — |
| | Median | 0.2 | 5 | 0.45 | 100 | 15 | — | — | 1.5 | 12.5 | 89 | 729 | 8.1 | 23 | 58 | — | — | — | — |
| | Minimum | 0.2 | 2 | 0.18 | 100 | 15 | — | — | 0 | 9 | 79 | 585 | 7.3 | 12 | 26 | — | — | — | — |
| | Maximum | 0.2 | 5.8 | 0.63 | 100 | 15 | — | — | 10.4 | 14.2 | 99 | 918 | 9.7 | 45 | 140 | — | — | — | — |
| | Std. dev. | 0 | 1 | 0.14 | — | — | — | — | 3.31 | 1.5 | 5.63 | 111 | 0.54 | 8.78 | 31.8 | — | — | — | — |
| | *N* obs. | 15 | 15 | 15 | 1 | 1 | 0 | 0 | 15 | 15 | 15 | 14 | 15 | 15 | 15 | 0 | 0 | 0 | 0 |
| I122.5X | Mean | 0.2 | 3.7 | 0.52 | 70 | 2 | — | — | 2.86 | 12.7 | 93 | 702 | 8.2 | 30.2 | 53 | — | — | — | — |
| | Median | 0.2 | 4 | 0.58 | 70 | 2 | — | — | 1.5 | 12.5 | 89 | 706 | 8.1 | 25 | 43 | — | — | — | — |
| | Minimum | 0.2 | 0.9 | 0.08 | 50 | 1 | — | — | 0.5 | 9.5 | 85 | 530 | 7.4 | 15 | 17 | — | — | — | — |
| | Maximum | 0.2 | 5 | 0.83 | 90 | 3 | — | — | 10.6 | 16.8 | 123 | 933 | 9.3 | 67 | 137 | — | — | — | — |
| | Std. dev. | 0 | 1.14 | 0.26 | 28.3 | 1.41 | — | — | 3.15 | 1.95 | 11.4 | 107 | 0.49 | 13.8 | 31.9 | — | — | — | — |
| | *N* obs. | 15 | 15 | 15 | 2 | 2 | 0 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 0 | 0 | 0 | 0 |
| I122.6Y | Mean | 0.2 | 3.71 | 0.44 | 65 | 2 | — | — | 11.2 | 10.4 | 91 | 628 | 8.3 | 36.5 | 37 | 36.2 | 13.7 | — | — |
| | Median | 0.2 | 3.7 | 0.43 | 65 | 2 | — | — | 6.5 | 11.8 | 88 | 615 | 8.3 | 38 | 29 | 27.3 | 7.1 | — | — |
| | Minimum | 0.2 | 1.65 | 0.02 | 50 | 1 | — | — | 0.5 | 5 | 64 | 494 | 7.4 | 15 | 14 | 14.7 | 4.9 | — | — |
| | Maximum | 0.2 | 5.7 | 0.81 | 80 | 3 | — | — | 27.2 | 15.2 | 138 | 830 | 9.6 | 68 | 140 | 144 | 103 | — | — |
| | Std. dev. | 0 | 1.05 | 0.23 | 21.2 | 1.41 | — | — | 9.94 | 2.85 | 15.3 | 82.6 | 0.5 | 14.2 | 23.5 | 32.5 | 24.7 | — | — |
| | *N* obs. | 33 | 33 | 33 | 2 | 2 | 0 | 0 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 15 | 15 | 0 | 0 |
| I124.8R | Mean | 0.2 | 3.17 | 0.08 | 95 | 7 | — | — | 4.75 | 11.8 | 90 | 701 | 8.3 | 29.3 | 57 | 65.9 | 11.9 | 44.4 | — |
| | Median | 0.2 | 3.25 | 0.1 | 95 | 7 | — | — | 1.9 | 12.4 | 89 | 708 | 8.2 | 25 | 45 | 65.9 | 11.9 | 44.4 | — |
| | Minimum | 0.2 | 1.7 | 0 | 90 | 3 | — | — | 0.8 | 8.9 | 82 | 558 | 7.4 | 10 | 18 | 65.9 | 11.9 | 44.4 | — |
| | Maximum | 0.2 | 4.2 | 0.17 | 100 | 10 | — | — | 20 | 14.6 | 105 | 965 | 9.5 | 70 | 120 | 65.9 | 11.9 | 44.4 | — |
| | Std. dev. | 0 | 0.79 | 0.06 | 7.07 | 4.95 | — | — | 5.65 | 1.64 | 5.8 | 112 | 0.56 | 17 | 33.6 | — | — | — | — |
| | *N* obs. | 15 | 13 | 13 | 2 | 2 | 0 | 0 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 1 | 1 | 1 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | **1993 Near-surface measurements:** | | | | | | | | | | |
| I127.9W | Mean | 0.2 | 3.04 | 0.12 | 97.5 | 4 | — | — | 4.45 | 11.8 | 90 | 674 | 8.3 | 36.4 | 44 | 50.9 | 9.3 | 14.8 | — |
| | Median | 0.2 | 3.3 | 0.07 | 100 | 3 | — | — | 1.95 | 12.3 | 91 | 640 | 8.2 | 38 | 38 | 53 | 8.7 | 5.46 | — |
| | Minimum | 0.2 | 0.87 | 0 | 90 | 1 | — | — | 0.8 | 8.9 | 76 | 514 | 7.6 | 14 | 15 | 12.9 | 2.6 | 1.07 | — |
| | Maximum | 0.2 | 4.21 | 0.35 | 100 | 8 | — | — | 19.2 | 14.2 | 103 | 944 | 9.1 | 70 | 110 | 84.6 | 17.1 | 47 | — |
| | Std. dev. | 0 | 0.99 | 0.12 | 5 | 3.4 | — | — | 5.25 | 1.59 | 6.59 | 114 | 0.44 | 16.6 | 28.7 | 31.7 | 6.16 | 21.6 | — |
| | *N* obs. | 15 | 14 | 14 | 4 | 4 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 4 | 4 | 4 | 0 |
| I128.8F | Mean | 0.2 | 3.48 | 0.43 | — | — | — | — | 4 | 12.3 | 92 | 700 | 8.2 | 31.8 | 49 | 52 | 7.1 | 8.93 | — |
| | Median | 0.2 | 3.83 | 0.44 | — | — | — | — | 1.8 | 12.5 | 89 | 711 | 8.2 | 26.5 | 40 | 50.1 | 6.4 | 4.22 | — |
| | Minimum | 0.2 | 1 | 0.14 | — | — | — | — | 0.5 | 7.5 | 78 | 546 | 7.4 | 10 | 11 | 19.9 | 2.7 | 2.67 | — |
| | Maximum | 0.2 | 5.1 | 0.68 | — | — | — | — | 20.1 | 17.4 | 126 | 989 | 8.8 | 65 | 140 | 87.7 | 12.9 | 24.6 | — |
| | Std. dev. | 0 | 1.08 | 0.17 | — | — | — | — | 5.31 | 2.34 | 10.9 | 107 | 0.44 | 16.3 | 34.5 | 28.8 | 4.9 | 10.5 | — |
| | *N* obs. | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 4 | 4 | 4 | 0 |
| I128.8T | Mean | 0.2 | 3.06 | 0.06 | 100 | 5 | — | — | 4.62 | 12.4 | 95 | 686 | 8.3 | 38.7 | 42 | 43 | 14 | 80.7 | — |
| | Median | 0.2 | 3.21 | 0.05 | 100 | 5 | — | — | 2 | 12.4 | 91 | 646 | 8.1 | 38 | 35 | 43 | 14 | 80.7 | — |
| | Minimum | 0.2 | 0.84 | 0 | 100 | 1 | — | — | 0.1 | 9.4 | 74 | 535 | 7.7 | 14 | 6 | 43 | 14 | 80.7 | — |
| | Maximum | 0.2 | 4.1 | 0.16 | 100 | 10 | — | — | 20.2 | 16.4 | 144 | 984 | 9.3 | 95 | 115 | 43 | 14 | 80.7 | — |
| | Std. dev. | 0 | 0.94 | 0.05 | 0 | 4.51 | — | — | 5.71 | 1.91 | 17.5 | 120 | 0.41 | 21.1 | 29.5 | — | — | — | — |
| | *N* obs. | 15 | 13 | 13 | 3 | 3 | 0 | 0 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 1 | 1 | 1 | 0 |
| I129.8W | Mean | 0.2 | 3.16 | 0.05 | 100 | 6 | — | — | 4.76 | 12.2 | 94 | 675 | 8.4 | 34.2 | 45 | 42.1 | 8.1 | 23.7 | — |
| | Median | 0.2 | 3.46 | 0.05 | 100 | 1 | — | — | 2.15 | 12.1 | 90 | 634 | 8.2 | 34 | 36 | 41.1 | 8.9 | 3.5 | — |
| | Minimum | 0.2 | 0.74 | 0 | 100 | 1 | — | — | 0.1 | 8.9 | 72 | 539 | 8 | 15 | 16 | 11.4 | 2.1 | 2.14 | — |
| | Maximum | 0.2 | 4.21 | 0.11 | 100 | 15 | — | — | 20 | 17.5 | 131 | 982 | 9.5 | 55 | 110 | 74.7 | 12.4 | 85.5 | — |
| | Std. dev. | 0 | 1.03 | 0.04 | 0 | 8.08 | — | — | 5.88 | 2.3 | 17.2 | 124 | 0.44 | 14.5 | 29.2 | 26.1 | 4.92 | 41.3 | — |
| | *N* obs. | 15 | 12 | 12 | 3 | 3 | 0 | 0 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 4 | 4 | 4 | 0 |
| I135.8W | Mean | 0.2 | 1.78 | 0.01 | 100 | 10 | — | — | 3.89 | 14.2 | 107 | 260 | 9 | 160 | 5 | — | — | — | — |
| | Median | 0.2 | 1.79 | 0 | 100 | 10 | — | — | 2.25 | 14.3 | 106 | 258 | 8.9 | 160 | 5 | — | — | — | — |
| | Minimum | 0.2 | 1.69 | 0 | 100 | 5 | — | — | 0 | 10.2 | 93 | 230 | 8.5 | 160 | 2 | — | — | — | — |
| | Maximum | 0.2 | 1.9 | 0.03 | 100 | 15 | — | — | 11 | 16.5 | 126 | 325 | 10 | 160 | 17 | — | — | — | — |
| | Std. dev. | 0 | 0.08 | 0.01 | 0 | 2.67 | — | — | 3.97 | 1.72 | 9.02 | 25.2 | 0.4 | — | 4.07 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | 8 | 8 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 1 | 14 | 0 | 0 | 0 | 0 |
| I135.8X | Mean | 0.2 | 1.49 | 0 | 100 | 13 | 60 | 3 | 4.39 | 14.8 | 113 | 258 | 9.1 | — | 4 | — | — | — | — |
| | Median | 0.2 | 1.49 | 0 | 100 | 13 | 60 | 3 | 3 | 15.2 | 110 | 256 | 9.2 | — | 5 | — | — | — | — |
| | Minimum | 0.2 | 1.39 | 0 | 100 | 5 | 60 | 3 | 0.9 | 8.7 | 79 | 225 | 8.4 | — | 2 | — | — | — | — |
| | Maximum | 0.2 | 1.6 | 0.04 | 100 | 20 | 60 | 3 | 12 | 19 | 141 | 316 | 9.5 | — | 8 | — | — | — | — |
| | Std. dev. | 0 | 0.06 | 0.01 | 0 | 5.24 | — | — | 4.03 | 2.6 | 17.2 | 24.8 | 0.35 | — | 1.74 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | 6 | 6 | 1 | 1 | 14 | 14 | 14 | 14 | 14 | 0 | 14 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I157.8D | Mean | 0.2 | 20.3 | — | — | — | — | — | 17.1 | 8.74 | 88 | 603 | 8.4 | 24.3 | 74 | 70.8 | 11.8 | — | — |
| | Median | 0.2 | 20.8 | — | — | — | — | — | 19.2 | 7.9 | 87 | 629 | 8.3 | 25.5 | 54 | 55.8 | 10.3 | — | — |
| | Minimum | 0.2 | 15.3 | — | — | — | — | — | 4 | 5.8 | 72 | 450 | 7.5 | 5 | 30 | 30.4 | 6.4 | — | — |
| | Maximum | 0.2 | 27.3 | — | — | — | — | — | 27 | 13.4 | 114 | 717 | 9.5 | 38 | 323 | 174 | 24.8 | — | — |
| | Std. dev. | 0 | 3.07 | — | — | — | — | — | 8.37 | 2.25 | 10.7 | 86.3 | 0.57 | 9.28 | 68.9 | 43.8 | 5.36 | — | — |
| | *N* obs. | 17 | 16 | 0 | 0 | 0 | 0 | 0 | 17 | 17 | 17 | 17 | 17 | 16 | 17 | 14 | 14 | 0 | 0 |
| LM00.5M | Mean | 0.2 | 6.31 | 0.15 | — | — | — | — | 8.69 | 9.89 | 83 | 503 | 8.6 | 56.3 | 27 | 30.9 | 6.6 | — | — |
| | Median | 0.2 | 6.1 | 0.13 | — | — | — | — | 5.2 | 10.7 | 83 | 510 | 8.6 | 59 | 20 | 20.6 | 5 | — | — |
| | Minimum | 0.2 | 5.2 | 0.08 | — | — | — | — | 3.8 | 7.1 | 73 | 444 | 8 | 20 | 8 | 10 | 2.8 | — | — |
| | Maximum | 0.2 | 7.9 | 0.25 | — | — | — | — | 18.1 | 12.4 | 94 | 585 | 9.3 | 105 | 57 | 91.8 | 13.7 | — | — |
| | Std. dev. | 0 | 0.98 | 0.07 | — | — | — | — | 5.41 | 2.1 | 8.49 | 49.3 | 0.53 | 32.4 | 18.5 | 31 | 4.39 | — | — |
| | *N* obs. | 7 | 7 | 4 | 0 | 0 | 0 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 6 | 0 | 0 |
| MK04.4M | Mean | 0.2 | 3.41 | — | — | — | — | — | 16.8 | 9.47 | 96 | 587 | 8.4 | — | 112 | 154 | 18.6 | — | — |
| | Median | 0.2 | 3.05 | — | — | — | — | — | 19 | 9.4 | 93 | 628 | 8.4 | — | 39 | 71.2 | 8.3 | — | — |
| | Minimum | 0.2 | 1.7 | — | — | — | — | — | 5 | 6.5 | 77 | 273 | 7.7 | — | 10 | 9.3 | 3.3 | — | — |
| | Maximum | 0.2 | 7 | — | — | — | — | — | 24.9 | 13.4 | 156 | 686 | 9.2 | — | 600 | 646 | 71.6 | — | — |
| | Std. dev. | 0 | 1.34 | — | — | — | — | — | 7.11 | 1.9 | 16.5 | 120 | 0.41 | — | 172 | 182 | 20.3 | — | — |
| | *N* obs. | 18 | 18 | 0 | 0 | 0 | 0 | 0 | 18 | 18 | 18 | 18 | 18 | 0 | 18 | 16 | 16 | 0 | 0 |
| QV04.6M | Mean | 0.2 | 0.86 | — | — | — | — | — | 15.5 | 8.38 | 84 | 540 | 8.1 | 70 | 31 | 50.2 | 7.8 | — | — |
| | Median | 0.2 | 0.6 | — | — | — | — | — | 16.6 | 7.95 | 81 | 561 | 8 | 70 | 19 | 28.1 | 4.7 | — | — |
| | Minimum | 0.2 | 0.4 | — | — | — | — | — | 7 | 7 | 73 | 150 | 7.5 | 70 | 10 | 6.9 | 1.8 | — | — |
| | Maximum | 0.2 | 3.5 | — | — | — | — | — | 23.2 | 11.8 | 139 | 600 | 8.7 | 70 | 220 | 269 | 30.2 | — | — |
| | Std. dev. | 0 | 0.74 | — | — | — | — | — | 4.88 | 1.32 | 14.5 | 100 | 0.39 | — | 47.9 | 65.7 | 7.6 | — | — |
| | *N* obs. | 18 | 18 | 0 | 0 | 0 | 0 | 0 | 18 | 18 | 18 | 18 | 18 | 1 | 18 | 16 | 16 | 0 | 0 |
| S000.2K | Mean | 0.2 | 5.79 | 0.61 | 100 | 7 | — | — | 10.6 | 10.3 | 87 | 619 | 8.1 | 37.7 | 152 | 270 | 22.7 | — | — |
| | Median | 0.2 | 5.5 | 0.46 | 100 | 8 | — | — | 7.5 | 11.1 | 90 | 640 | 8 | 32 | 45 | 54.8 | 8.1 | — | — |
| | Minimum | 0.2 | 3.7 | 0 | 100 | 2 | — | — | 0 | 2.7 | 33 | 230 | 7.4 | 1 | 7 | 6.2 | 2.2 | — | — |
| | Maximum | 0.2 | 8 | 1.61 | 100 | 12 | — | — | 25 | 13.6 | 107 | 830 | 9.4 | 122 | 910 | 2171 | 129 | — | — |
| | Std. dev. | 0 | 1.07 | 0.49 | 0 | 4.57 | — | — | 9.37 | 2.82 | 12.5 | 155 | 0.52 | 33 | 224 | 528 | 33.2 | — | — |
| | *N* obs. | 33 | 33 | 18 | 4 | 4 | 0 | 0 | 32 | 33 | 32 | 33 | 33 | 33 | 33 | 19 | 19 | 0 | 0 |
| SG16.2C | Mean | 0.2 | 4.91 | 1.46 | — | — | — | — | 12.2 | 9.72 | 88 | 566 | 8.4 | — | 98 | 145 | 16.1 | — | — |
| | Median | 0.2 | 4.3 | 1.43 | — | — | — | — | 11 | 10.4 | 89 | 577 | 8.1 | — | 59 | 87.2 | 11.7 | — | — |
| | Minimum | 0.2 | 3 | 1.18 | — | — | — | — | 1.1 | 3 | 28 | 312 | 7.4 | — | 17 | 15.9 | 3.4 | — | — |
| | Maximum | 0.2 | 8 | 1.85 | — | — | — | — | 26.5 | 14.4 | 110 | 746 | 9.6 | — | 387 | 689 | 55.5 | — | — |
| | Std. dev. | 0 | 1.47 | 0.19 | — | — | — | — | 8.64 | 2.56 | 13.7 | 105 | 0.54 | — | 93.4 | 169 | 14.3 | — | — |
| | *N* obs. | 33 | 32 | 13 | 0 | 0 | 0 | 0 | 32 | 32 | 32 | 32 | 31 | 0 | 32 | 19 | 19 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| I094.8D | Mean | 3.65 | 3.85 | 0.28 | — | — | — | — | 2.96 | 12 | 88 | 739 | 8.1 | — | 64 | — | — | — | — |
| | Median | 3.9 | 4.1 | 0.28 | — | — | — | — | 1.6 | 12.4 | 89 | 756 | 8.1 | — | 52 | — | — | — | — |
| | Minimum | 1.6 | 1.8 | 0.2 | — | — | — | — | 0.1 | 8.5 | 77 | 595 | 7.4 | — | 30 | — | — | — | — |
| | Maximum | 4.8 | 5 | 0.41 | — | — | — | — | 11 | 14.1 | 100 | 954 | 8.9 | — | 200 | — | — | — | — |
| | Std. dev. | 0.92 | 0.92 | 0.06 | — | — | — | — | 3.39 | 1.44 | 5.35 | 114 | 0.37 | — | 43.6 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | — | — | — | — | 14 | 14 | 14 | 14 | 14 | — | 14 | 0 | 0 | 0 | 0 |
| I095.2C | Mean | 4.32 | 4.53 | 0.29 | — | — | — | — | 2.87 | 12 | 88 | 731 | 8.1 | — | 59 | — | — | — | — |
| | Median | 4.4 | 4.6 | 0.29 | — | — | — | — | 1.3 | 12.4 | 89 | 756 | 8.1 | — | 49 | — | — | — | — |
| | Minimum | 1.3 | 1.5 | 0.15 | — | — | — | — | 0.2 | 8.5 | 77 | 578 | 7.5 | — | 27 | — | — | — | — |
| | Maximum | 6.8 | 7 | 0.5 | — | — | — | — | 11 | 14.1 | 99 | 939 | 8.5 | — | 140 | — | — | — | — |
| | Std. dev. | 1.72 | 1.72 | 0.09 | — | — | — | — | 3.36 | 1.47 | 5.5 | 114 | 0.29 | — | 33.6 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | — | — | — | — | 14 | 14 | 14 | 14 | 14 | — | 14 | 0 | 0 | 0 | 0 |
| I098.0C | Mean | 3.33 | 3.54 | 0.17 | — | — | — | — | 3.32 | 11.8 | 88 | 733 | 8.1 | — | 52 | — | — | — | — |
| | Median | 3.8 | 4 | 0.15 | — | — | — | — | 1.75 | 12.4 | 88 | 715 | 8.1 | — | 48 | — | — | — | — |
| | Minimum | 1.6 | 1.85 | 0.07 | — | — | — | — | 0.3 | 8.6 | 78 | 603 | 7.6 | — | 30 | — | — | — | — |
| | Maximum | 3.9 | 4.1 | 0.36 | — | — | — | — | 11.1 | 13.4 | 93 | 941 | 8.8 | — | 88 | — | — | — | — |
| | Std. dev. | 0.76 | 0.75 | 0.08 | — | — | — | — | 3.58 | 1.37 | 3.75 | 114 | 0.36 | — | 18.8 | — | — | — | — |
| | *N* obs. | 12 | 12 | 12 | — | — | — | — | 12 | 12 | 12 | 12 | 12 | — | 12 | 0 | 0 | 0 | 0 |
| I099.4C | Mean | 2.88 | 3.08 | 0.16 | — | — | — | — | 3.24 | 11.9 | 88 | 730 | 8.1 | — | 48 | — | — | — | — |
| | Median | 3.1 | 3.3 | 0.15 | — | — | — | — | 1.4 | 12.3 | 88 | 729 | 8.1 | — | 41 | — | — | — | — |
| | Minimum | 1.3 | 1.5 | 0.04 | — | — | — | — | 1 | 8.7 | 79 | 599 | 7.7 | — | 20 | — | — | — | — |
| | Maximum | 3.7 | 3.9 | 0.26 | — | — | — | — | 11 | 14 | 98 | 928 | 8.8 | — | 110 | — | — | — | — |
| | Std. dev. | 0.72 | 0.72 | 0.07 | — | — | — | — | 3.53 | 1.42 | 4.67 | 114 | 0.3 | — | 26.3 | — | — | — | — |
| | *N* obs. | 12 | 12 | 12 | — | — | — | — | 12 | 12 | 12 | 12 | 12 | — | 12 | 0 | 0 | 0 | 0 |
| I099.4D | Mean | 3.16 | 3.36 | 0.21 | — | — | — | — | 3.2 | 11.9 | 88 | 720 | 8.1 | — | 46 | — | — | — | — |
| | Median | 3.45 | 3.65 | 0.23 | — | — | — | — | 1.4 | 12.3 | 88 | 705 | 8.1 | — | 44 | — | — | — | — |
| | Minimum | 1.4 | 1.6 | 0.05 | — | — | — | — | 0.5 | 8.8 | 80 | 600 | 7.5 | — | 21 | — | — | — | — |
| | Maximum | 3.8 | 4 | 0.33 | — | — | — | — | 10.9 | 13.7 | 95 | 920 | 8.9 | — | 97 | — | — | — | — |
| | Std. dev. | 0.76 | 0.76 | 0.07 | — | — | — | — | 3.53 | 1.39 | 4.11 | 112 | 0.36 | — | 22.1 | — | — | — | — |
| | *N* obs. | 12 | 12 | 12 | — | — | — | — | 12 | 12 | 12 | 12 | 12 | — | 12 | 0 | 0 | 0 | 0 |
| I106.5X | Mean | 3.08 | 3.28 | 0.21 | — | — | — | — | 3.31 | 12 | 90 | 721 | 8.2 | — | 46 | — | — | — | — |
| | Median | 3.4 | 3.6 | 0.25 | — | — | — | — | 1.8 | 12.4 | 87 | 687 | 8.1 | — | 40 | — | — | — | — |
| | Minimum | 1.2 | 1.47 | 0 | — | — | — | — | 0.6 | 8.8 | 80 | 595 | 7.8 | — | 13 | — | — | — | — |
| | Maximum | 4.3 | 4.5 | 0.35 | — | — | — | — | 10.9 | 16.2 | 121 | 920 | 8.9 | — | 105 | — | — | — | — |
| | Std. dev. | 0.83 | 0.82 | 0.11 | — | — | — | — | 3.39 | 1.73 | 10.1 | 114 | 0.34 | — | 29.8 | — | — | — | — |
| | *N* obs. | 13 | 13 | 13 | — | — | — | — | 13 | 13 | 13 | 13 | 12 | — | 13 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| I106.5Y | Mean | 2.88 | 3.09 | 0.19 | — | — | — | — | 3.37 | 11.9 | 89 | 726 | 8.1 | — | 48 | — | — | — | — |
| | Median | 3.2 | 3.4 | 0.2 | — | — | — | — | 1.9 | 12.4 | 88 | 697 | 8 | — | 40 | — | — | — | — |
| | Minimum | 1.2 | 1.45 | 0 | — | — | — | — | 0.5 | 8.8 | 80 | 582 | 7.8 | — | 14 | — | — | — | — |
| | Maximum | 4 | 4.2 | 0.36 | — | — | — | — | 10.9 | 15 | 113 | 922 | 8.8 | — | 110 | — | — | — | — |
| | Std. dev. | 0.88 | 0.86 | 0.11 | — | — | — | — | 3.38 | 1.53 | 8.08 | 112 | 0.31 | — | 28 | — | — | — | — |
| | *N* obs. | 13 | 13 | 13 | — | — | — | — | 13 | 13 | 13 | 13 | 13 | — | 13 | 0 | 0 | 0 | 0 |
| I106.8X | Mean | 3.7 | 3.9 | 0.2 | — | — | — | — | 3.04 | 11.7 | 87 | 716 | 8.1 | — | 47 | — | — | — | — |
| | Median | 3.8 | 4 | 0.21 | — | — | — | — | 1.3 | 12.2 | 87 | 680 | 8.1 | — | 47 | — | — | — | — |
| | Minimum | 2.4 | 2.62 | 0 | — | — | — | — | 0 | 8.8 | 80 | 575 | 7.8 | — | 17 | — | — | — | — |
| | Maximum | 4.7 | 4.9 | 0.34 | — | — | — | — | 10.9 | 12.6 | 93 | 922 | 8.8 | — | 107 | — | — | — | — |
| | Std. dev. | 0.58 | 0.58 | 0.1 | — | — | — | — | 3.51 | 1.2 | 3.55 | 118 | 0.32 | — | 23.8 | — | — | — | — |
| | *N* obs. | 13 | 13 | 13 | — | — | — | — | 13 | 13 | 13 | 13 | 13 | — | 13 | 0 | 0 | 0 | 0 |
| I107.0S | Mean | 4.75 | 4.95 | 0.3 | — | — | — | — | 2.6 | 12.3 | 90 | 744 | 8.1 | — | 50 | — | — | — | — |
| | Median | 5.1 | 5.3 | 0.28 | — | — | — | — | 1 | 12.4 | 88 | 744 | 8 | — | 40 | — | — | — | — |
| | Minimum | 2.3 | 2.5 | 0.23 | — | — | — | — | 0.1 | 8.8 | 80 | 580 | 7.4 | — | 27 | — | — | — | — |
| | Maximum | 6.8 | 7 | 0.42 | — | — | — | — | 10.9 | 14.4 | 105 | 913 | 9 | — | 135 | — | — | — | — |
| | Std. dev. | 1.36 | 1.35 | 0.07 | — | — | — | — | 3.43 | 1.51 | 6.37 | 112 | 0.39 | — | 27 | — | — | — | — |
| | *N* obs. | 15 | 15 | 15 | — | — | — | — | 15 | 15 | 15 | 15 | 15 | — | 15 | 0 | 0 | 0 | 0 |
| I107.2R | Mean | 4.77 | 4.97 | 0.32 | — | — | — | — | 3.09 | 12.4 | 91 | 739 | 8.2 | — | 50 | — | — | — | — |
| | Median | 4.8 | 5 | 0.34 | — | — | — | — | 1.1 | 12.5 | 91 | 732 | 8.1 | — | 45 | — | — | — | — |
| | Minimum | 1.5 | 1.7 | 0.16 | — | — | — | — | 1 | 8.5 | 77 | 595 | 7.5 | — | 28 | — | — | — | — |
| | Maximum | 7 | 7.2 | 0.46 | — | — | — | — | 10.9 | 15.7 | 111 | 916 | 8.9 | — | 130 | — | — | — | — |
| | Std. dev. | 1.81 | 1.81 | 0.1 | — | — | — | — | 3.45 | 1.9 | 8.74 | 114 | 0.41 | — | 27.8 | — | — | — | — |
| | *N* obs. | 15 | 15 | 13 | — | — | — | — | 13 | 13 | 13 | 13 | 13 | — | 13 | 0 | 0 | 0 | 0 |
| I109.5D | Mean | 2.34 | 2.58 | 0.01 | — | — | — | — | 3.12 | 12.4 | 92 | 652 | 8.2 | — | 41 | — | — | — | — |
| | Median | 2.6 | 2.84 | 0.01 | — | — | — | — | 1.95 | 12 | 86 | 631 | 8.1 | — | 33 | — | — | — | — |
| | Minimum | 1.1 | 1.44 | 0 | — | — | — | — | 0.8 | 9 | 79 | 484 | 7.5 | — | 16 | — | — | — | — |
| | Maximum | 3.3 | 3.59 | 0.05 | — | — | — | — | 11.2 | 17.7 | 124 | 909 | 8.9 | — | 93 | — | — | — | — |
| | Std. dev. | 0.67 | 0.65 | 0.01 | — | — | — | — | 3.19 | 2.25 | 13.2 | 111 | 0.38 | — | 24.6 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | — | — | — | — | 14 | 14 | 14 | 14 | 14 | — | 14 | 0 | 0 | 0 | 0 |
| I113.0T | Mean | 5.53 | 5.73 | 0.37 | — | — | — | — | 11 | 9.93 | 85 | 665 | 8.3 | — | 68 | — | — | — | — |
| | Median | 5.8 | 6 | 0.35 | — | — | — | — | 6.2 | 11.2 | 87 | 632 | 8.1 | — | 51 | — | — | — | — |
| | Minimum | 2.4 | 2.6 | 0.12 | — | — | — | — | 0 | 5.2 | 65 | 460 | 7.4 | — | 25 | — | — | — | — |
| | Maximum | 7.7 | 7.9 | 0.68 | — | — | — | — | 27.1 | 14 | 101 | 928 | 9.4 | — | 270 | — | — | — | — |
| | Std. dev. | 1.28 | 1.28 | 0.15 | — | — | — | — | 10.1 | 3.01 | 9.13 | 126 | 0.53 | — | 54.9 | — | — | — | — |
| | *N* obs. | 33 | 33 | 28 | — | — | — | — | 31 | 31 | 31 | 31 | 30 | — | 30 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| I121.2W | Mean | 5.4 | 5.61 | 0.37 | — | — | — | — | 7.14 | 11.1 | 89 | 692 | 8.2 | — | 77 | — | — | — | — |
| | Median | 5.5 | 5.7 | 0.37 | — | — | — | — | 2.8 | 12.2 | 88 | 681 | 8.2 | — | 57 | — | — | — | — |
| | Minimum | 2.6 | 2.8 | 0.22 | — | — | — | — | 0.1 | 5.6 | 69 | 550 | 7.4 | — | 31 | — | — | — | — |
| | Maximum | 8 | 8.2 | 0.52 | — | — | — | — | 25.3 | 13.8 | 111 | 941 | 8.9 | — | 160 | — | — | — | — |
| | Std. dev. | 1.34 | 1.33 | 0.1 | — | — | — | — | 8.33 | 2.29 | 8.58 | 122 | 0.45 | — | 43.3 | — | — | — | — |
| | *N* obs. | 19 | 19 | 13 | — | — | — | — | 17 | 17 | 17 | 17 | 17 | — | 17 | 0 | 0 | 0 | 0 |
| I121.5X | Mean | 4.33 | 4.54 | 0.33 | — | — | — | — | 2.73 | 12.3 | 90 | 740 | 8.2 | — | 73 | — | — | — | — |
| | Median | 4.8 | 5 | 0.33 | — | — | — | — | 1.5 | 12.4 | 88 | 732 | 8.1 | — | 64 | — | — | — | — |
| | Minimum | 1.8 | 2 | 0.15 | — | — | — | — | 0 | 8.8 | 77 | 597 | 7.4 | — | 32 | — | — | — | — |
| | Maximum | 5.6 | 5.8 | 0.52 | — | — | — | — | 10.4 | 14.2 | 98 | 930 | 8.9 | — | 140 | — | — | — | — |
| | Std. dev. | 1.01 | 1 | 0.09 | — | — | — | — | 3.26 | 1.52 | 5.96 | 111 | 0.39 | — | 33.4 | — | — | — | — |
| | *N* obs. | 15 | 15 | 15 | — | — | — | — | 15 | 15 | 15 | 14 | 15 | — | 15 | 0 | 0 | 0 | 0 |
| I122.5X | Mean | 3.7 | 3.9 | 0.43 | — | — | — | — | 2.82 | 12.3 | 90 | 703 | 8.1 | — | 56 | — | — | — | — |
| | Median | 3.8 | 4 | 0.46 | — | — | — | — | 1.35 | 12.5 | 88 | 700 | 8.1 | — | 47 | — | — | — | — |
| | Minimum | 1.7 | 1.91 | 0.06 | — | — | — | — | 0.4 | 9.4 | 84 | 523 | 7.4 | — | 14 | — | — | — | — |
| | Maximum | 4.8 | 5 | 0.69 | — | — | — | — | 10.6 | 16.7 | 118 | 935 | 8.9 | — | 140 | — | — | — | — |
| | Std. dev. | 0.87 | 0.87 | 0.2 | — | — | — | — | 3.27 | 1.68 | 8.5 | 115 | 0.44 | — | 33.8 | — | — | — | — |
| | *N* obs. | 14 | 14 | 13 | — | — | — | — | 14 | 14 | 14 | 14 | 14 | — | 14 | 0 | 0 | 0 | 0 |
| I122.6Y | Mean | 3.51 | 3.71 | 0.31 | — | — | — | — | 11.1 | 10.4 | 91 | 633 | 8.3 | — | 43 | — | — | — | — |
| | Median | 3.5 | 3.7 | 0.27 | — | — | — | — | 6.4 | 11.8 | 87 | 622 | 8.3 | — | 36 | — | — | — | — |
| | Minimum | 1.4 | 1.65 | 0.02 | — | — | — | — | 0.5 | 6 | 67 | 498 | 7.5 | — | 15 | — | — | — | — |
| | Maximum | 5.5 | 5.7 | 0.67 | — | — | — | — | 27.1 | 16 | 133 | 837 | 9.6 | — | 140 | — | — | — | — |
| | Std. dev. | 1.06 | 1.05 | 0.2 | — | — | — | — | 9.9 | 2.87 | 14.2 | 86.4 | 0.46 | — | 25.1 | — | — | — | — |
| | *N* obs. | 33 | 33 | 27 | — | — | — | — | 33 | 33 | 33 | 33 | 33 | — | 32 | 0 | 0 | 0 | 0 |
| I124.8R | Mean | 2.95 | 3.17 | 0.05 | — | — | — | — | 4.72 | 11.7 | 90 | 702 | 8.3 | — | 59 | — | — | — | — |
| | Median | 3 | 3.25 | 0.06 | — | — | — | — | 1.9 | 12.2 | 88 | 707 | 8.1 | — | 47 | — | — | — | — |
| | Minimum | 1.4 | 1.7 | 0 | — | — | — | — | 0.8 | 8.7 | 81 | 559 | 7.4 | — | 17 | — | — | — | — |
| | Maximum | 4 | 4.2 | 0.11 | — | — | — | — | 19.9 | 14.6 | 104 | 969 | 9.1 | — | 123 | — | — | — | — |
| | Std. dev. | 0.81 | 0.79 | 0.04 | — | — | — | — | 5.63 | 1.66 | 5.72 | 113 | 0.49 | — | 34 | — | — | — | — |
| | *N* obs. | 13 | 13 | 13 | — | — | — | — | 13 | 13 | 13 | 13 | 13 | — | 13 | 0 | 0 | 0 | 0 |
| I127.9W | Mean | 3 | 3.21 | 0.09 | — | — | — | — | 4.6 | 11.7 | 89 | 693 | 8.2 | — | 43 | — | — | — | — |
| | Median | 3.1 | 3.3 | 0.06 | — | — | — | — | 2.5 | 12.2 | 90 | 659 | 8.1 | — | 40 | — | — | — | — |
| | Minimum | 1.5 | 1.7 | 0.01 | — | — | — | — | 0.7 | 8.7 | 75 | 552 | 7.6 | — | 17 | — | — | — | — |
| | Maximum | 4 | 4.21 | 0.28 | — | — | — | — | 19.1 | 14.1 | 102 | 947 | 8.9 | — | 89 | — | — | — | — |
| | Std. dev. | 0.81 | 0.81 | 0.09 | — | — | — | — | 5.38 | 1.65 | 6.38 | 109 | 0.39 | — | 22.1 | — | — | — | — |
| | *N* obs. | 13 | 13 | 12 | — | — | — | — | 13 | 13 | 13 | 13 | 12 | — | 12 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| I128.8F | Mean | 3.43 | 3.64 | 0.34 | — | — | — | — | 4.09 | 11.9 | 89 | 716 | 8.1 | — | 56 | — | — | — | — |
| | Median | 3.6 | 3.85 | 0.34 | — | — | — | — | 1.6 | 12.4 | 88 | 711 | 8.2 | — | 53 | — | — | — | — |
| | Minimum | 1.6 | 1.8 | 0.11 | — | — | — | — | 0.5 | 7.3 | 77 | 580 | 7.4 | — | 11 | — | — | — | — |
| | Maximum | 4.9 | 5.1 | 0.49 | — | — | — | — | 20 | 14.3 | 101 | 995 | 8.8 | — | 145 | — | — | — | — |
| | Std. dev. | 0.89 | 0.89 | 0.12 | — | — | — | — | 5.44 | 2.01 | 6.9 | 108 | 0.42 | — | 34.7 | — | — | — | — |
| | *N* obs. | 15 | 15 | 15 | — | — | — | — | 15 | 15 | 15 | 14 | 15 | — | 15 | 0 | 0 | 0 | 0 |
| I128.8T | Mean | 3.03 | 3.24 | 0.04 | — | — | — | — | 5.02 | 11.9 | 93 | 689 | 8.3 | — | 44 | — | — | — | — |
| | Median | 3.05 | 3.26 | 0.03 | — | — | — | — | 2.45 | 12.3 | 90 | 665 | 8.1 | — | 41 | — | — | — | — |
| | Minimum | 1.4 | 1.6 | 0 | — | — | — | — | 0.5 | 9.3 | 74 | 541 | 7.7 | — | 12 | — | — | — | — |
| | Maximum | 3.9 | 4.1 | 0.12 | — | — | — | — | 20.1 | 14.2 | 137 | 975 | 9.1 | — | 88 | — | — | — | — |
| | Std. dev. | 0.7 | 0.7 | 0.04 | — | — | — | — | 5.73 | 1.56 | 16.2 | 121 | 0.38 | — | 21 | — | — | — | — |
| | *N* obs. | 12 | 12 | 12 | — | — | — | — | 12 | 12 | 12 | 12 | 11 | — | 11 | 0 | 0 | 0 | 0 |
| I129.8W | Mean | 3.17 | 3.37 | 0.03 | — | — | — | — | 5.1 | 11.6 | 90 | 686 | 8.3 | — | 43 | — | — | — | — |
| | Median | 3.4 | 3.6 | 0.02 | — | — | — | — | 2.3 | 12 | 90 | 642 | 8.2 | — | 40 | — | — | — | — |
| | Minimum | 1.5 | 1.7 | 0 | — | — | — | — | 0.3 | 8.9 | 72 | 541 | 8 | — | 19 | — | — | — | — |
| | Maximum | 4 | 4.21 | 0.09 | — | — | — | — | 19.9 | 14.5 | 123 | 982 | 9 | — | 87 | — | — | — | — |
| | Std. dev. | 0.73 | 0.73 | 0.03 | — | — | — | — | 5.97 | 1.63 | 13.8 | 125 | 0.36 | — | 20.8 | — | — | — | — |
| | *N* obs. | 11 | 11 | 11 | — | — | — | — | 11 | 11 | 11 | 11 | 10 | — | 10 | 0 | 0 | 0 | 0 |
| I135.8W | Mean | 1.51 | 1.78 | 0 | — | — | — | — | 4.14 | 14.3 | 108 | 261 | 9 | — | 3 | — | — | — | — |
| | Median | 1.5 | 1.79 | 0 | — | — | — | — | 2.9 | 14.4 | 108 | 267 | 9 | — | 3 | — | — | — | — |
| | Minimum | 1.4 | 1.69 | 0 | — | — | — | — | 0 | 9.9 | 90 | 220 | 8.4 | — | 2 | — | — | — | — |
| | Maximum | 1.7 | 1.9 | 0.02 | — | — | — | — | 11 | 17 | 127 | 311 | 9.6 | — | 8 | — | — | — | — |
| | Std. dev. | 0.11 | 0.08 | 0.01 | — | — | — | — | 3.81 | 1.9 | 10.8 | 25.7 | 0.33 | — | 1.6 | — | — | — | — |
| | *N* obs. | 14 | 14 | 14 | — | — | — | — | 14 | 14 | 14 | 14 | 14 | — | 14 | 0 | 0 | 0 | 0 |
| I135.8X | Mean | 1.27 | 1.5 | 0 | — | — | — | — | 4.91 | 14.1 | 109 | 253 | 9 | — | 4 | — | — | — | — |
| | Median | 1.3 | 1.5 | 0 | — | — | — | — | 3.2 | 14.7 | 111 | 257 | 9 | — | 3 | — | — | — | — |
| | Minimum | 1.2 | 1.4 | 0 | — | — | — | — | 0.9 | 8.5 | 77 | 224 | 8.3 | — | 2 | — | — | — | — |
| | Maximum | 1.4 | 1.6 | 0 | — | — | — | — | 11.4 | 16.6 | 132 | 278 | 9.5 | — | 6 | — | — | — | — |
| | Std. dev. | 0.08 | 0.06 | 0 | — | — | — | — | 4.19 | 2.22 | 14.6 | 18.4 | 0.33 | — | 1.51 | — | — | — | — |
| | *N* obs. | 11 | 11 | 11 | — | — | — | — | 11 | 11 | 11 | 11 | 11 | — | 11 | 0 | 0 | 0 | 0 |
| LM00.5M | Mean | 6.11 | 6.31 | 0.08 | — | — | — | — | 8.59 | 9.91 | 83 | 511 | 8.4 | — | 34 | — | — | — | — |
| | Median | 5.9 | 6.1 | 0.08 | — | — | — | — | 5.1 | 10.8 | 84 | 517 | 8.4 | — | 23 | — | — | — | — |
| | Minimum | 5 | 5.2 | 0.06 | — | — | — | — | 3.7 | 7 | 73 | 441 | 7.8 | — | 9 | — | — | — | — |
| | Maximum | 7.7 | 7.9 | 0.09 | — | — | — | — | 18.1 | 12.4 | 94 | 595 | 9.2 | — | 62 | — | — | — | — |
| | Std. dev. | 0.98 | 0.98 | 0.02 | — | — | — | — | 5.48 | 2.18 | 9.02 | 54.9 | 0.54 | — | 23.5 | — | — | — | — |
| | *N* obs. | 7 | 7 | 2 | — | — | — | — | 7 | 7 | 7 | 7 | 7 | — | 7 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| MK04.4M | Mean | 2.89 | 3.09 | — | — | — | — | — | 16 | 9.4 | 94 | 625 | 8.4 | — | 71 | — | — | — | — |
| | Median | 2.8 | 3 | — | — | — | — | — | 18 | 9.3 | 93 | 633 | 8.5 | — | 42 | — | — | — | — |
| | Minimum | 1.5 | 1.7 | — | — | — | — | — | 4.8 | 7.4 | 84 | 424 | 7.8 | — | 9 | — | — | — | — |
| | Maximum | 4.8 | 5 | — | — | — | — | — | 25.1 | 12.4 | 109 | 691 | 9.1 | — | 395 | — | — | — | — |
| | Std. dev. | 0.95 | 0.95 | — | — | — | — | — | 7.2 | 1.62 | 6.42 | 61.4 | 0.36 | — | 96.4 | — | — | — | — |
| | *N* obs. | 16 | 16 | 0 | — | — | — | — | 16 | 16 | 16 | 16 | 16 | — | 15 | 0 | 0 | 0 | 0 |
| S000.2K | Mean | 5.59 | 5.8 | 0.19 | — | — | — | — | 10.2 | 10.5 | 88 | 690 | 8.2 | — | 99 | — | — | — | — |
| | Median | 5.3 | 5.5 | 0.19 | — | — | — | — | 7.55 | 11.1 | 92 | 698 | 8.2 | — | 54 | — | — | — | — |
| | Minimum | 3.4 | 3.7 | 0 | — | — | — | — | 0 | 1.7 | 21 | 296 | 7.3 | — | 7 | — | — | — | — |
| | Maximum | 7.8 | 8 | 0.35 | — | — | — | — | 24.5 | 13.6 | 106 | 843 | 9.2 | — | 435 | — | — | — | — |
| | Std. dev. | 1.12 | 1.11 | 0.11 | — | — | — | — | 8.78 | 2.9 | 15 | 114 | 0.45 | — | 123 | — | — | — | — |
| | *N* obs. | 29 | 29 | 12 | — | — | — | — | 26 | 27 | 26 | 27 | 27 | — | 26 | 0 | 0 | 0 | 0 |
| SG16.2C | Mean | 4.51 | 4.71 | — | — | — | — | — | 12.8 | 9.78 | 89 | 577 | 8.3 | — | 92 | — | — | — | — |
| | Median | 4 | 4.2 | — | — | — | — | — | 11 | 10.6 | 91 | 572 | 8.2 | — | 61 | — | — | — | — |
| | Minimum | 2.8 | 3 | — | — | — | — | — | 1.2 | 2.9 | 27 | 330 | 7.6 | — | 14 | — | — | — | — |
| | Maximum | 7.8 | 8 | — | — | — | — | — | 26.3 | 14 | 110 | 695 | 9.2 | — | 380 | — | — | — | — |
| | Std. dev. | 1.48 | 1.48 | — | — | — | — | — | 8.92 | 2.69 | 15.5 | 86.7 | 0.43 | — | 94.5 | — | — | — | — |
| | *N* obs. | 25 | 25 | 0 | — | — | — | — | 22 | 22 | 22 | 22 | 21 | — | 22 | 0 | 0 | 0 | 0 |
| **1994 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I080.2C | Mean | 0.2 | 5.49 | — | 80 | 15 | 60 | 2 | 15.3 | 8.74 | 82 | 692 | 8.1 | 20.5 | 90 | 112 | 15.3 | 36.4 | 2.69 |
| | Median | 0.2 | 5.2 | — | 80 | 15 | 60 | 2 | 16.4 | 8.3 | 82 | 699 | 8.1 | 20 | 74 | 82.4 | 14.3 | 35.1 | 2.69 |
| | Minimum | 0.2 | 3.7 | — | 80 | 15 | 60 | 2 | 0 | 4 | 54 | 456 | 7.7 | 6 | 35 | 43.2 | 7.1 | 7.13 | 2.69 |
| | Maximum | 0.2 | 10.1 | — | 80 | 15 | 60 | 2 | 30.5 | 13.7 | 107 | 895 | 9.1 | 40 | 280 | 389 | 38.8 | 65.9 | 2.69 |
| | Std. dev. | 0 | 1.46 | — | — | — | — | — | 9.89 | 3.07 | 14.7 | 99 | 0.34 | 7.18 | 54.3 | 83.3 | 7.23 | 16.5 | — |
| | *N* obs. | 25 | 23 | 0 | 1 | 1 | 1 | 1 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 25 | 18 | 1 |
| I080.2M | Mean | 0.2 | 6.49 | — | — | — | — | — | 16 | 9.12 | 88 | 676 | 8.2 | 20.4 | 83 | 101 | 14.2 | 36.1 | — |
| | Median | 0.2 | 6.4 | — | — | — | — | — | 16.4 | 8.4 | 90 | 701 | 8.2 | 20 | 59 | 69.5 | 12.3 | 32.7 | — |
| | Minimum | 0.2 | 5.1 | — | — | — | — | — | 1.2 | 4.6 | 62 | 410 | 7.7 | 5 | 32 | 33.2 | 6.9 | 9.98 | — |
| | Maximum | 0.2 | 8.2 | — | — | — | — | — | 30.3 | 14.1 | 105 | 850 | 9.3 | 30 | 280 | 344 | 39.2 | 72.8 | — |
| | Std. dev. | 0 | 0.84 | — | — | — | — | — | 9.68 | 2.79 | 13.4 | 98.9 | 0.45 | 6.27 | 67.4 | 85.7 | 8.09 | 19.4 | — |
| | *N* obs. | 23 | 23 | 0 | 0 | 0 | 0 | 0 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 17 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I109.5D | Mean | 0.2 | 1.28 | 0.02 | 100 | 6 | — | — | 19.2 | 11.9 | 130 | 520 | 8.8 | 26.2 | 55 | 45.5 | 23.9 | 191 | — |
| | Median | 0.2 | 1.2 | 0 | 100 | 6 | — | — | 21.8 | 11.4 | 112 | 520 | 8.7 | 21 | 65 | 44.7 | 26.2 | 192 | — |
| | Minimum | 0.2 | 0.9 | 0 | 100 | 6 | — | — | 2.8 | 7.6 | 77 | 414 | 8.1 | 13 | 6 | 6 | 4.1 | 23.2 | — |
| | Maximum | 0.2 | 1.8 | 0.11 | 100 | 6 | — | — | 31.1 | 17.2 | 208 | 594 | 9.7 | 85 | 94 | 90.9 | 36.8 | 391 | — |
| | Std. dev. | 0 | 0.23 | 0.03 | — | — | — | — | 8.7 | 2.91 | 41.7 | 59.3 | 0.48 | 17.4 | 24.5 | 23.4 | 10.2 | 106 | — |
| | *N* obs. | 17 | 17 | 17 | 1 | 1 | 0 | 0 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 0 |
| I113.0T | Mean | 0.2 | 3.06 | 0.32 | 75 | 1 | — | — | 15.5 | 9 | 85 | 731 | 8.1 | 21.8 | 72 | 89.5 | 13.6 | 34.3 | 1.63 |
| | Median | 0.2 | 2.8 | 0.26 | 75 | 1 | — | — | 15.8 | 8.6 | 87 | 711 | 8 | 21 | 73 | 81.9 | 13.8 | 29.5 | 1.63 |
| | Minimum | 0.2 | 1.55 | 0.1 | 75 | 1 | — | — | 0.5 | 4.8 | 62 | 571 | 7.7 | 11 | 28 | 34.1 | 6.5 | 10.5 | 1.63 |
| | Maximum | 0.2 | 5.5 | 0.73 | 75 | 1 | — | — | 30.1 | 14.6 | 122 | 968 | 8.9 | 41 | 135 | 208 | 22.5 | 91.1 | 1.63 |
| | Std. dev. | 0 | 1.11 | 0.18 | — | — | — | — | 9.99 | 3.18 | 14.9 | 90.1 | 0.33 | 6.22 | 24.8 | 38.2 | 4.27 | 19.9 | — |
| | *N* obs. | 25 | 25 | 24 | 1 | 1 | 0 | 0 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 18 | 1 |
| I121.2W | Mean | 0.2 | 2.88 | 0.37 | 41.7 | 8 | 100 | 3 | 14.9 | 9.67 | 91 | 754 | 8.2 | 20.6 | 74 | 96.6 | 15.1 | 40.6 | 0.56 |
| | Median | 0.2 | 3.05 | 0.37 | 15 | 10 | 100 | 3 | 15.6 | 9.75 | 91 | 732 | 8.1 | 19 | 74 | 91.4 | 14.6 | 35.6 | 0.56 |
| | Minimum | 0.2 | 1.15 | 0.37 | 10 | 1 | 100 | 3 | 0 | 5.2 | 64 | 589 | 7.7 | 10 | 27 | 30.6 | 5.6 | 8.73 | 0.56 |
| | Maximum | 0.2 | 4.3 | 0.37 | 100 | 14 | 100 | 3 | 30.3 | 14.1 | 134 | 1109 | 9.3 | 33 | 155 | 213 | 27.5 | 91.7 | 0.56 |
| | Std. dev. | 0 | 0.86 | — | 50.6 | 6.66 | — | — | 10.3 | 2.82 | 15.9 | 111 | 0.38 | 6.09 | 29.9 | 45.9 | 5.88 | 24.2 | — |
| | *N* obs. | 26 | 26 | 1 | 3 | 3 | 1 | 1 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 18 | 1 |
| I122.6Y | Mean | 0.2 | 1.96 | 0.19 | 100 | 2 | — | — | 14.6 | 10.3 | 99 | 586 | 8.3 | 28.7 | 51 | 49.7 | 10.5 | 30.4 | 0.62 |
| | Median | 0.2 | 1.8 | 0.12 | 100 | 2 | — | — | 12.8 | 9.6 | 91 | 569 | 8.1 | 27 | 44 | 42.8 | 10 | 25 | 0.62 |
| | Minimum | 0.2 | 0.9 | 0 | 100 | 2 | — | — | 0.8 | 7.5 | 73 | 467 | 7.8 | 10 | 8 | 5.2 | 2.1 | 3.97 | 0.62 |
| | Maximum | 0.2 | 4 | 0.8 | 100 | 2 | — | — | 30 | 17.8 | 192 | 795 | 9.4 | 95 | 110 | 148 | 26.8 | 82.3 | 0.62 |
| | Std. dev. | 0 | 0.95 | 0.2 | — | — | — | — | 9.36 | 2.5 | 24.7 | 76.3 | 0.39 | 16.4 | 27.5 | 31 | 5.38 | 23 | — |
| | *N* obs. | 25 | 25 | 25 | 1 | 1 | 0 | 0 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 18 | 1 |
| I157.8D | Mean | 0.2 | 20.7 | — | 52.5 | 18 | — | — | 14.9 | 9.99 | 95 | 748 | 8.3 | 22.2 | 62 | 67.8 | 13.2 | 44 | 2.3 |
| | Median | 0.2 | 21 | — | 52.5 | 18 | — | — | 15.1 | 9.8 | 94 | 723 | 8.2 | 21 | 60 | 61.1 | 13.4 | 32.7 | 2.3 |
| | Minimum | 0.2 | 16.8 | — | 10 | 5 | — | — | 0.2 | 5.1 | 68 | 615 | 7.8 | 13 | 28 | 20.1 | 4.9 | 3.12 | 2.3 |
| | Maximum | 0.2 | 25 | — | 95 | 30 | — | — | 29.3 | 14.6 | 125 | 1085 | 9.8 | 40 | 98 | 139 | 22.3 | 94.5 | 2.3 |
| | Std. dev. | 0 | 2.37 | — | 60.1 | 17.7 | — | — | 10.2 | 2.52 | 12.6 | 104 | 0.51 | 6.65 | 18.6 | 28.2 | 3.97 | 24.9 | — |
| | *N* obs. | 25 | 23 | 0 | 2 | 2 | 0 | 0 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 18 | 1 |
| LM00.5M | Mean | 0.2 | 5.15 | 0.32 | 75 | 6 | — | — | 16.2 | 10.3 | 107 | 524 | 8.2 | 35.2 | 170 | 234 | 25.2 | 7.41 | — |
| | Median | 0.2 | 5.2 | 0.32 | 75 | 6 | — | — | 17 | 10.6 | 90 | 529 | 8 | 30 | 41 | 38.3 | 13.9 | 7.41 | — |
| | Minimum | 0.2 | 3.1 | 0.32 | 50 | 2 | — | — | 0.1 | 4.2 | 47 | 347 | 7.5 | 1 | 6 | 3.7 | 2 | 3.12 | — |
| | Maximum | 0.2 | 7.6 | 0.32 | 100 | 10 | — | — | 30.6 | 16.3 | 222 | 745 | 9.2 | 144 | 2450 | 3667 | 301 | 11.7 | — |
| | Std. dev. | 0 | 1.17 | — | 35.4 | 5.66 | — | — | 9.75 | 3.26 | 46.8 | 97.3 | 0.5 | 35.2 | 501 | 754 | 60.7 | 6.06 | — |
| | *N* obs. | 23 | 23 | 1 | 2 | 2 | 0 | 0 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 2 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| LM07.2M | Mean | 0.2 | 2.35 | — | 100 | 16 | 98 | 2 | 14 | 10 | 95 | 541 | 8.1 | 70.5 | 185 | 236 | 28.3 | 16 | 2.07 |
| | Median | 0.2 | 2 | — | 100 | 17 | 98 | 2 | 12.7 | 9.9 | 92 | 568 | 8.1 | 65.5 | 59 | 61.4 | 13.6 | 16 | 2.07 |
| | Minimum | 0.2 | 1.1 | — | 100 | 10 | 95 | 1 | 0 | 5.2 | 57 | 330 | 7.3 | 21 | 5 | 5 | 1.9 | 13.4 | 2.07 |
| | Maximum | 0.2 | 4.5 | — | 100 | 22 | 100 | 3 | 28.8 | 17.9 | 145 | 744 | 9.1 | 130 | 1720 | 2076 | 230 | 18.7 | 2.07 |
| | Std. dev. | 0 | 0.96 | — | 0 | 6.03 | 3.54 | 1.4 | 9.45 | 2.77 | 21.2 | 112 | 0.43 | 53 | 372 | 474 | 49.1 | 3.78 | — |
| | *N* obs. | 25 | 24 | 0 | 3 | 3 | 2 | 2 | 25 | 25 | 25 | 25 | 25 | 4 | 25 | 25 | 25 | 2 | 1 |
| MK04.4M | Mean | 0.2 | 1.28 | — | 100 | 18 | 100 | 3 | 13.7 | 11.6 | 113 | 635 | 8.3 | 51.3 | 55 | 87.1 | 11.9 | 40 | 1.43 |
| | Median | 0.2 | 0.95 | — | 100 | 18 | 100 | 3 | 14.2 | 11.7 | 103 | 620 | 8.1 | 50 | 23 | 35.6 | 6 | 40 | 1.43 |
| | Minimum | 0.2 | 0.35 | — | 100 | 18 | 100 | 3 | 0 | 6.7 | 55 | 483 | 7.8 | 35 | 5 | 3.8 | 2.4 | 25.5 | 1.43 |
| | Maximum | 0.2 | 5 | — | 100 | 18 | 100 | 3 | 27.9 | 16.2 | 209 | 754 | 9.4 | 78 | 580 | 1075 | 84.3 | 54.5 | 1.43 |
| | Std. dev. | 0 | 1.05 | — | — | — | — | — | 9.22 | 2.24 | 34.5 | 68.5 | 0.47 | 14.3 | 113 | 207 | 16.2 | 20.6 | — |
| | *N* obs. | 26 | 26 | 0 | 1 | 1 | 1 | 1 | 26 | 26 | 26 | 26 | 26 | 6 | 26 | 26 | 26 | 2 | 1 |
| QV04.6M | Mean | 0.2 | 0.44 | — | — | — | — | — | 13.1 | 9.21 | 87 | 563 | 8.1 | 40.3 | 24 | 33.5 | 5.5 | 2.83 | 0 |
| | Median | 0.2 | 0.4 | — | — | — | — | — | 12.6 | 9.2 | 85 | 564 | 8 | 40 | 18 | 20.6 | 4 | 2.83 | 0 |
| | Minimum | 0.2 | 0.25 | — | — | — | — | — | 5.5 | 6.4 | 71 | 352 | 7.8 | 30 | 6 | 2.8 | 2.3 | 2.67 | 0 |
| | Maximum | 0.2 | 0.8 | — | — | — | — | — | 23.8 | 12.3 | 101 | 635 | 9.2 | 60 | 105 | 154 | 21 | 2.99 | 0 |
| | Std. dev. | 0 | 0.14 | — | — | — | — | — | 5.22 | 1.24 | 6.08 | 52.7 | 0.35 | 9.72 | 23.9 | 38.4 | 4.53 | 0.23 | — |
| | *N* obs. | 26 | 26 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 15 | 26 | 26 | 26 | 2 | 1 |
| S000.2K | Mean | 0.2 | 3.42 | 0.43 | 100 | 13 | 65 | 3 | 13.8 | 10.5 | 99 | 721 | 8.2 | 42.1 | 63 | 79.3 | 47.8 | 34.9 | 1.04 |
| | Median | 0.2 | 3.2 | 0.43 | 100 | 12 | 75 | 2 | 12 | 10.3 | 98 | 719 | 8.1 | 25.5 | 47 | 62 | 10.5 | 34.9 | 1.04 |
| | Minimum | 0.2 | 1.2 | 0.43 | 100 | 4 | 10 | 1 | 0 | 7.3 | 76 | 545 | 7.7 | 8 | 5 | 3.1 | 1.8 | 3.74 | 1.04 |
| | Maximum | 0.2 | 6.1 | 0.43 | 100 | 21 | 100 | 8 | 30.1 | 14.5 | 133 | 905 | 9.4 | 150 | 330 | 316 | 929 | 66.1 | 1.04 |
| | Std. dev. | 0 | 1.37 | — | 0 | 7.6 | 43.6 | 3.4 | 10.4 | 2.3 | 13.4 | 98.6 | 0.36 | 39.3 | 69 | 75.9 | 180 | 44.1 | — |
| | *N* obs. | 26 | 26 | 1 | 5 | 5 | 4 | 4 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 2 | 1 |
| SG16.2C | Mean | 0.2 | 3.16 | — | — | — | — | — | 13.9 | 11.6 | 111 | 661 | 8.3 | 18 | 122 | 184 | 23.3 | 18.7 | 0 |
| | Median | 0.2 | 3.1 | — | — | — | — | — | 13.7 | 11.8 | 97 | 655 | 8.2 | 18 | 32 | 85.8 | 15.2 | 18.7 | 0 |
| | Minimum | 0.2 | 1.2 | — | — | — | — | — | 0 | 6.3 | 70 | 285 | 7.4 | 18 | 7 | 11.1 | 2.8 | 7.48 | 0 |
| | Maximum | 0.2 | 9.5 | — | — | — | — | — | 29.3 | 21 | 252 | 884 | 9.7 | 18 | 750 | 1241 | 94.8 | 29.9 | 0 |
| | Std. dev. | 0 | 1.92 | — | — | — | — | — | 8.96 | 3.26 | 39.9 | 152 | 0.49 | — | 200 | 285 | 25.6 | 15.9 | — |
| | *N* obs. | 26 | 25 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 1 | 25 | 25 | 25 | 2 | 1 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Middepth measurements:** | | | | | | | | | | | | | | | | | | | |
| I109.5D | Mean | 0.65 | 1.33 | — | — | — | — | — | 24.5 | 10.8 | 130 | 455 | 9.6 | — | 44 | — | — | — | — |
| | Median | 0.65 | 1.3 | — | — | — | — | — | 24 | 11.1 | 136 | 462 | 9.7 | — | 33 | — | — | — | — |
| | Minimum | 0.4 | 0.9 | — | — | — | — | — | 19.5 | 8 | 100 | 424 | 9.4 | — | 31 | — | — | — | — |
| | Maximum | 0.9 | 1.8 | — | — | — | — | — | 31.1 | 13.4 | 157 | 473 | 9.7 | — | 69 | — | — | — | — |
| | Std. dev. | 0.16 | 0.31 | — | — | — | — | — | 4.13 | 2.38 | 24.6 | 21.7 | 0.14 | — | 21.4 | — | — | — | — |
| | *N* obs. | 6 | 6 | 0 | — | — | — | — | 6 | 6 | 6 | 4 | 4 | — | 3 | 0 | 0 | 0 | 0 |
| **1994 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| I109.5D | Mean | 1.1 | 1.31 | 0.01 | — | — | — | — | 18.1 | 8.78 | 90 | 527 | 8.8 | — | 58 | — | — | — | — |
| | Median | 1 | 1.2 | 0 | — | — | — | — | 19.8 | 9.95 | 89 | 537 | 8.7 | — | 62 | — | — | — | — |
| | Minimum | 0.7 | 0.9 | 0 | — | — | — | — | 4.3 | 2.1 | 26 | 426 | 8.1 | — | 18 | — | — | — | — |
| | Maximum | 1.6 | 1.8 | 0.04 | — | — | — | — | 30.1 | 15.4 | 125 | 593 | 9.5 | — | 94 | — | — | — | — |
| | Std. dev. | 0.2 | 0.21 | 0.01 | — | — | — | — | 8.13 | 3.31 | 27.7 | 56.3 | 0.43 | — | 21.8 | — | — | — | — |
| | *N* obs. | 16 | 16 | 14 | — | — | — | — | 16 | 16 | 16 | 16 | 16 | — | 15 | 0 | 0 | 0 | 0 |
| I113.0T | Mean | 2.84 | 3.06 | 0.21 | — | — | — | — | 15.9 | 8.78 | 83 | 735 | 8.1 | — | 77 | — | — | — | — |
| | Median | 2.6 | 2.8 | 0.17 | — | — | — | — | 17 | 8.25 | 84 | 714 | 8 | — | 79 | — | — | — | — |
| | Minimum | 1.3 | 1.55 | 0.08 | — | — | — | — | 0.5 | 4.6 | 62 | 560 | 7.7 | — | 33 | — | — | — | — |
| | Maximum | 5.3 | 5.5 | 0.61 | — | — | — | — | 30.1 | 14.4 | 120 | 1025 | 8.6 | — | 120 | — | — | — | — |
| | Std. dev. | 1.11 | 1.11 | 0.15 | — | — | — | — | 10 | 3.16 | 14.6 | 97.7 | 0.28 | — | 21.8 | — | — | — | — |
| | *N* obs. | 25 | 25 | 18 | — | — | — | — | 24 | 24 | 24 | 25 | 25 | — | 24 | 0 | 0 | 0 | 0 |
| I122.6Y | Mean | 1.89 | 2.1 | 0.13 | — | — | — | — | 14.1 | 9.82 | 92 | 602 | 8.2 | — | 60 | — | — | — | — |
| | Median | 1.6 | 1.8 | 0.07 | — | — | — | — | 14.4 | 9.3 | 90 | 589 | 8.1 | — | 48 | — | — | — | — |
| | Minimum | 0.7 | 0.9 | 0 | — | — | — | — | 0.8 | 4.6 | 60 | 501 | 7.8 | — | 12 | — | — | — | — |
| | Maximum | 3.8 | 4 | 0.4 | — | — | — | — | 28.5 | 14.2 | 118 | 760 | 9 | — | 114 | — | — | — | — |
| | Std. dev. | 0.92 | 0.93 | 0.14 | — | — | — | — | 9.2 | 2.41 | 13.8 | 78.5 | 0.38 | — | 33.4 | — | — | — | — |
| | *N* obs. | 22 | 22 | 21 | — | — | — | — | 22 | 22 | 22 | 22 | 22 | — | 22 | 0 | 0 | 0 | 0 |
| LM00.5M | Mean | 4.98 | 5.18 | — | — | — | — | — | 13.2 | 8.36 | 76 | 532 | 8.2 | — | 108 | — | — | — | — |
| | Median | 5.05 | 5.25 | — | — | — | — | — | 13.5 | 7.95 | 82 | 529 | 7.9 | — | 67 | — | — | — | — |
| | Minimum | 2.9 | 3.1 | — | — | — | — | — | 0.1 | 2.5 | 30 | 376 | 7.6 | — | 7 | — | — | — | — |
| | Maximum | 7.4 | 7.6 | — | — | — | — | — | 27.8 | 13.2 | 114 | 750 | 9.6 | — | 380 | — | — | — | — |
| | Std. dev. | 1.3 | 1.29 | — | — | — | — | — | 7.97 | 3.34 | 22.7 | 106 | 0.64 | — | 108 | — | — | — | — |
| | *N* obs. | 16 | 16 | 0 | — | — | — | — | 16 | 16 | 16 | 15 | 15 | — | 13 | 0 | 0 | 0 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| LM07.2M | Mean | 2.84 | 3.05 | — | — | — | — | — | 9.17 | 11.7 | 98 | 598 | 8.4 | — | 30 | — | — | — | — |
| | Median | 3.3 | 3.5 | — | — | — | — | — | 6.9 | 11.6 | 95 | 594 | 8.4 | — | 14 | — | — | — | — |
| | Minimum | 1.3 | 1.55 | — | — | — | — | — | 0.1 | 7.6 | 71 | 501 | 7.6 | — | 7 | — | — | — | — |
| | Maximum | 3.8 | 4 | — | — | — | — | — | 28.6 | 17 | 117 | 724 | 9.2 | — | 110 | — | — | — | — |
| | Std. dev. | 1.05 | 1.04 | — | — | — | — | — | 10.6 | 3.16 | 17.7 | 76.1 | 0.66 | — | 39.9 | — | — | — | — |
| | *N* obs. | 7 | 7 | 0 | — | — | — | — | 7 | 7 | 7 | 6 | 6 | — | 6 | 0 | 0 | 0 | 0 |
| MK04.4M | Mean | 1.79 | 1.99 | — | — | — | — | — | 8.39 | 11 | 91 | 630 | 8.3 | — | 178 | — | — | — | — |
| | Median | 1.7 | 1.9 | — | — | — | — | — | 4.25 | 11.2 | 94 | 612 | 8.3 | — | 26 | — | — | — | — |
| | Minimum | 1.2 | 1.4 | — | — | — | — | — | 0 | 8.3 | 76 | 488 | 7.9 | — | 7 | — | — | — | — |
| | Maximum | 2.8 | 3 | — | — | — | — | — | 23.5 | 14.1 | 98 | 770 | 8.8 | — | 1108 | — | — | — | — |
| | Std. dev. | 0.6 | 0.6 | — | — | — | — | — | 9.17 | 2.04 | 7.94 | 91.2 | 0.33 | — | 381 | — | — | — | — |
| | *N* obs. | 8 | 8 | 0 | — | — | — | — | 8 | 8 | 8 | 8 | 8 | — | 8 | 0 | 0 | 0 | 0 |
| S000.2K | Mean | 3.72 | 3.93 | — | — | — | — | — | 11.5 | 10.6 | 93 | 736 | 8.3 | — | 75 | — | — | — | — |
| | Median | 3.5 | 3.7 | — | — | — | — | — | 10.2 | 11 | 95 | 724 | 8.2 | — | 61 | — | — | — | — |
| | Minimum | 1.6 | 1.8 | — | — | — | — | — | 0 | 7.1 | 74 | 546 | 7.5 | — | 5 | — | — | — | — |
| | Maximum | 5.9 | 6.1 | — | — | — | — | — | 28.9 | 13.8 | 107 | 888 | 9.3 | — | 420 | — | — | — | — |
| | Std. dev. | 1.45 | 1.44 | — | — | — | — | — | 10.5 | 2.59 | 8.15 | 105 | 0.45 | — | 102 | — | — | — | — |
| | *N* obs. | 15 | 15 | 0 | — | — | — | — | 15 | 15 | 15 | 15 | 15 | — | 15 | 0 | 0 | 0 | 0 |
| **1995 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I080.2C | Mean | 0.2 | 5.47 | — | — | — | — | — | 14.4 | 9.52 | 87 | 674 | 7.8 | 20.6 | 114 | 93.7 | 12.9 | 29.1 | 17.4 |
| | Median | 0.2 | 5.15 | — | — | — | — | — | 14.3 | 10 | 86 | 694 | 7.8 | 20 | 65 | 71.4 | 10.6 | 27.1 | 17.4 |
| | Minimum | 0.2 | 3.5 | — | — | — | — | — | 0.6 | 4.3 | 56 | 436 | 7.4 | 8 | 36 | 36.7 | 5.4 | 2.49 | 13.3 |
| | Maximum | 0.2 | 10.7 | — | — | — | — | — | 31 | 15.1 | 109 | 843 | 8.1 | 35 | 950 | 254 | 24.9 | 79.8 | 21.5 |
| | Std. dev. | 0 | 1.48 | — | — | — | — | — | 10.7 | 3.35 | 13.3 | 111 | 0.19 | 7.08 | 176 | 61 | 5.91 | 16.7 | 5.83 |
| | *N* obs. | 26 | 20 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 26 | 25 | 25 | 25 | 26 | 26 | 26 | 26 | 2 |
| I080.2M | Mean | 0.2 | 6.9 | 0.81 | — | — | — | — | 13.1 | 10.3 | 92 | 697 | 7.8 | 22.5 | 72 | 93.3 | 12.7 | 26.3 | 23.5 |
| | Median | 0.2 | 6.7 | 0.81 | — | — | — | — | 9.3 | 11.2 | 93 | 706 | 7.9 | 21 | 55 | 54 | 11.3 | 26.2 | 23.5 |
| | Minimum | 0.2 | 5.05 | 0.55 | — | — | — | — | 1.1 | 4.4 | 59 | 458 | 7.4 | 9 | 36 | 27.5 | 6.6 | 1.87 | 23.5 |
| | Maximum | 0.2 | 11.3 | 1.06 | — | — | — | — | 31.7 | 17 | 120 | 836 | 8.1 | 36 | 142 | 270 | 24.2 | 56.1 | 23.5 |
| | Std. dev. | 0 | 1.4 | 0.36 | — | — | — | — | 10.6 | 3.41 | 14.7 | 92.7 | 0.19 | 7.21 | 35.7 | 70.4 | 5.61 | 15.5 | — |
| | *N* obs. | 19 | 16 | 2 | 0 | 0 | 0 | 0 | 19 | 19 | 19 | 18 | 18 | 19 | 19 | 19 | 19 | 19 | 1 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I109.5D | Mean | 0.2 | 1.56 | 0.01 | 98 | 12 | — | — | 14.5 | 12.7 | 124 | 547 | 8.4 | 33.8 | 39 | 36.6 | 14 | 75.1 | 18.5 |
| | Median | 0.2 | 1.3 | 0 | 100 | 10 | — | — | 14.1 | 11.9 | 112 | 547 | 8.5 | 30.5 | 34 | 31.8 | 13.7 | 60.2 | 18.5 |
| | Minimum | 0.2 | 0.9 | 0 | 90 | 6 | — | — | 0 | 7.6 | 85 | 491 | 7.6 | 15 | 10 | 8.1 | 4.1 | 10.2 | 18.5 |
| | Maximum | 0.2 | 4.6 | 0.11 | 100 | 20 | — | — | 32.9 | 25 | 344 | 613 | 8.9 | 70 | 130 | 80.6 | 24.9 | 163 | 18.5 |
| | Std. dev. | 0 | 0.87 | 0.03 | 4.47 | 6.02 | — | — | 10.5 | 4.01 | 50.8 | 32.5 | 0.34 | 16.4 | 25.5 | 20.7 | 5.98 | 47.3 | — |
| | *N* obs. | 26 | 26 | 25 | 5 | 5 | 0 | 0 | 26 | 26 | 26 | 25 | 25 | 26 | 26 | 26 | 26 | 26 | 1 |
| I113.0T | Mean | 0.2 | 3.92 | 0.38 | — | — | — | — | 13.9 | 9.89 | 89 | 710 | 7.9 | 22.2 | 101 | 84.5 | 13.1 | 26.8 | 22.3 |
| | Median | 0.2 | 3.25 | 0.28 | — | — | — | — | 12.4 | 9.5 | 90 | 713 | 7.8 | 20 | 68 | 83.6 | 12.7 | 21.3 | 22.3 |
| | Minimum | 0.2 | 1.4 | 0.11 | — | — | — | — | 0.8 | 3.9 | 52 | 568 | 7.6 | 5 | 27 | 18.6 | 5.4 | 1.5 | 22.3 |
| | Maximum | 0.2 | 9.45 | 1 | — | — | — | — | 30.7 | 15.4 | 109 | 892 | 8.1 | 49 | 730 | 273 | 25.9 | 92.3 | 22.3 |
| | Std. dev. | 0 | 1.94 | 0.25 | — | — | — | — | 10.4 | 3.56 | 14.6 | 85.9 | 0.15 | 9.1 | 138 | 48.2 | 5.21 | 19.2 | — |
| | *N* obs. | 26 | 26 | 20 | 0 | 0 | 0 | 0 | 26 | 26 | 26 | 25 | 25 | 26 | 26 | 26 | 26 | 26 | 1 |
| I121.2W | Mean | 0.2 | 3.41 | 0.32 | 95 | 6 | — | — | 14 | 10 | 91 | 730 | 7.9 | 22.1 | 74 | 85 | 14 | 27.6 | 29 |
| | Median | 0.2 | 3.2 | 0.36 | 95 | 6 | — | — | 12.5 | 10.4 | 93 | 718 | 7.8 | 20 | 75 | 80 | 13.6 | 23.9 | 29 |
| | Minimum | 0.2 | 1.15 | 0.07 | 95 | 6 | — | — | 0.1 | 4.1 | 56 | 577 | 7.4 | 12 | 22 | 17.7 | 4.6 | -1 | 29 |
| | Maximum | 0.2 | 9.15 | 0.52 | 95 | 6 | — | — | 31 | 15.3 | 111 | 943 | 8.2 | 45 | 230 | 290 | 36.8 | 92.3 | 29 |
| | Std. dev. | 0 | 1.69 | 0.15 | — | — | — | — | 10.7 | 3.23 | 12.4 | 87.6 | 0.2 | 8.23 | 39.1 | 53.1 | 6.84 | 18.7 | — |
| | *N* obs. | 26 | 26 | 7 | 1 | 1 | 0 | 0 | 26 | 26 | 26 | 25 | 25 | 26 | 26 | 26 | 26 | 26 | 1 |
| I122.6Y | Mean | 0.2 | 2.44 | 0.2 | 90 | 2 | — | — | 13.3 | 10.7 | 99 | 607 | 7.9 | 31.3 | 49 | 55.4 | 10 | 25.2 | 0.65 |
| | Median | 0.2 | 1.78 | 0.13 | 90 | 2 | — | — | 10.8 | 11 | 95 | 608 | 7.9 | 27.5 | 40 | 38.8 | 8.6 | 17.8 | 0.65 |
| | Minimum | 0.2 | 0.8 | 0 | 90 | 2 | — | — | 0.8 | 7.3 | 82 | 505 | 7.5 | 10 | 12 | 7.6 | 2.7 | 1.94 | 0.65 |
| | Maximum | 0.2 | 6.7 | 1 | 90 | 2 | — | — | 30.2 | 14.5 | 137 | 786 | 8.6 | 90 | 135 | 333 | 39 | 93 | 0.65 |
| | Std. dev. | 0 | 1.71 | 0.23 | — | — | — | — | 9.8 | 2.35 | 13.2 | 74.5 | 0.27 | 17.2 | 31.4 | 62.3 | 6.87 | 23.8 | — |
| | *N* obs. | 26 | 26 | 20 | 1 | 1 | 0 | 0 | 26 | 26 | 26 | 25 | 25 | 26 | 25 | 26 | 26 | 26 | 1 |
| I157.8D | Mean | 0.2 | 20 | — | 95 | 7 | — | — | 14.6 | 10.4 | 98 | 730 | 7.9 | 22.4 | 78 | 86.6 | 14.4 | 33.2 | — |
| | Median | 0.2 | 19.2 | — | 95 | 7 | — | — | 14.6 | 10.1 | 98 | 726 | 7.9 | 19 | 67 | 57.5 | 11.9 | 25.8 | — |
| | Minimum | 0.2 | 17.3 | — | 95 | 7 | — | — | 0.2 | 6.3 | 80 | 528 | 7.5 | 11 | 24 | 21.7 | 4.7 | -1 | — |
| | Maximum | 0.2 | 23.2 | — | 95 | 7 | — | — | 30.7 | 14.7 | 123 | 986 | 8.7 | 48 | 146 | 255 | 36.9 | 85.1 | — |
| | Std. dev. | 0 | 2.71 | — | — | — | — | — | 10.4 | 2.69 | 9.8 | 95.8 | 0.29 | 9.26 | 34 | 63.5 | 7.4 | 21.7 | — |
| | *N* obs. | 24 | 7 | 0 | 1 | 1 | 0 | 0 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 24 | 24 | 0 |
| LM00.5M | Mean | 0.2 | 5.96 | — | 100 | 7 | — | — | 12.2 | 11.8 | 111 | 496 | 7.7 | 41.6 | 104 | 150 | 16 | 14 | — |
| | Median | 0.2 | 5.4 | — | 100 | 7 | — | — | 10.2 | 11.8 | 92 | 527 | 7.8 | 28 | 39 | 39.8 | 7.3 | 14 | — |
| | Minimum | 0.2 | 3.6 | — | 100 | 3 | — | — | 0.1 | 6 | 63 | 280 | 7.1 | 3 | 5 | 2.4 | 1.6 | 14 | — |
| | Maximum | 0.2 | 12.4 | — | 100 | 11 | — | — | 29.7 | 25 | 333 | 647 | 8.7 | 165 | 1000 | 1775 | 138 | 14 | — |
| | Std. dev. | 0 | 2.54 | — | 0 | 4 | — | — | 10.4 | 5.42 | 68.6 | 111 | 0.38 | 43.1 | 222 | 400 | 30.1 | — | — |
| | *N* obs. | 19 | 18 | 0 | 3 | 3 | 0 | 0 | 19 | 19 | 19 | 18 | 18 | 19 | 19 | 19 | 19 | 1 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| LM07.2M | Mean | 0.2 | 3.98 | 0.96 | 100 | 10 | — | — | 12.4 | 9.98 | 90 | 461 | 7.5 | 78 | 177 | 189 | 18.5 | 36.5 | — |
| | Median | 0.2 | 3.8 | 0.96 | 100 | 10 | — | — | 10.9 | 10.7 | 89 | 492 | 7.5 | 30 | 51 | 65.3 | 8.8 | 36.5 | — |
| | Minimum | 0.2 | 1.3 | 0.96 | 100 | 10 | — | — | -0.1 | 5.6 | 65 | 110 | 7 | 4 | 5 | 3.3 | 1.7 | 28.1 | — |
| | Maximum | 0.2 | 9.45 | 0.96 | 100 | 10 | — | — | 29.2 | 14.5 | 145 | 640 | 8.2 | 200 | 1240 | 1803 | 137 | 44.9 | — |
| | Std. dev. | 0 | 1.9 | — | — | — | — | — | 9.78 | 2.85 | 16.5 | 146 | 0.25 | 106 | 302 | 376 | 28.9 | 11.9 | — |
| | *N* obs. | 26 | 20 | 1 | 1 | 1 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 3 | 26 | 26 | 26 | 2 | 0 |
| MK04.4M | Mean | 0.2 | 1.96 | — | — | — | — | — | 13 | 11.9 | 112 | 620 | 7.9 | 83.3 | 111 | 110 | 13.2 | 51.5 | — |
| | Median | 0.2 | 1.3 | — | — | — | — | — | 11.3 | 12.1 | 103 | 649 | 7.9 | 100 | 30 | 43.7 | 8.1 | 51.5 | — |
| | Minimum | 0.2 | 0.6 | — | — | — | — | — | 0 | 7.4 | 84 | 370 | 7.5 | 40 | 4 | 3.2 | 1.6 | 13.1 | — |
| | Maximum | 0.2 | 4.7 | — | — | — | — | — | 30.7 | 15.9 | 175 | 765 | 8.7 | 110 | 1300 | 1050 | 78 | 89.8 | — |
| | Std. dev. | 0 | 1.37 | — | — | — | — | — | 9.82 | 2.05 | 25.6 | 87.6 | 0.29 | 37.9 | 262 | 210 | 16 | 54.2 | — |
| | *N* obs. | 26 | 23 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 3 | 26 | 26 | 26 | 2 | 0 |
| QV04.6M | Mean | 0.2 | 0.48 | — | — | — | — | — | 12.6 | 9.68 | 90 | 576 | 7.7 | 40.3 | 23 | 33.9 | 5.5 | 5.77 | — |
| | Median | 0.2 | 0.4 | — | — | — | — | — | 12.1 | 9.5 | 90 | 577 | 7.7 | 40 | 13 | 15.4 | 3.8 | 5.77 | — |
| | Minimum | 0.2 | 0.2 | — | — | — | — | — | 2.4 | 7.2 | 77 | 535 | 7.2 | 20 | 6 | 2.7 | 2.1 | 3.12 | — |
| | Maximum | 0.2 | 1 | — | — | — | — | — | 23.8 | 12.8 | 112 | 617 | 8.3 | 50 | 135 | 143 | 16 | 8.42 | — |
| | Std. dev. | 0 | 0.22 | — | — | — | — | — | 6.13 | 1.58 | 6.83 | 23 | 0.28 | 8.65 | 25.9 | 38 | 3.78 | 3.75 | — |
| | *N* obs. | 26 | 26 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 16 | 26 | 26 | 26 | 2 | 0 |
| S000.2K | Mean | 0.2 | 3.86 | 0.82 | 100 | 9 | 0 | 0 | 12.9 | 10.3 | 94 | 677 | 7.8 | 40.3 | 134 | 139 | 14.1 | 30.6 | — |
| | Median | 0.2 | 3.3 | 0.96 | 100 | 10 | 0 | 0 | 11.2 | 10.6 | 93 | 710 | 7.8 | 30 | 40 | 43.9 | 7.6 | 30.6 | — |
| | Minimum | 0.2 | 1.35 | 0 | 100 | 4 | 0 | 0 | -0.1 | 6.9 | 79 | 420 | 7.5 | 3 | 7 | 4.5 | 1.7 | 16.8 | — |
| | Maximum | 0.2 | 8.55 | 1.5 | 100 | 12 | 0 | 0 | 29.8 | 14.1 | 110 | 846 | 8.1 | 145 | 1400 | 1443 | 106 | 44.3 | — |
| | Std. dev. | 0 | 2.02 | 0.76 | 0 | 3.4 | — | — | 10.4 | 2.25 | 7.7 | 106 | 0.19 | 37.1 | 297 | 292 | 21.4 | 19.4 | — |
| | *N* obs. | 26 | 25 | 3 | 4 | 4 | 1 | 1 | 26 | 26 | 26 | 25 | 25 | 25 | 26 | 26 | 26 | 2 | 0 |
| SG16.2C | Mean | 0.2 | 2.12 | — | — | — | — | — | 13.8 | 12 | 116 | 629 | 7.9 | — | 100 | 156 | 18.8 | 21.1 | — |
| | Median | 0.2 | 1.7 | — | — | — | — | — | 12.7 | 11.9 | 102 | 595 | 7.9 | — | 34 | 68.4 | 13.7 | 21.1 | — |
| | Minimum | 0.2 | 0.9 | — | — | — | — | — | 0.9 | 6.8 | 77 | 362 | 7.3 | — | 5 | 2.7 | 2.6 | 18.7 | — |
| | Maximum | 0.2 | 5 | — | — | — | — | — | 30.9 | 25 | 328 | 890 | 8.7 | — | 625 | 1170 | 95.3 | 23.4 | — |
| | Std. dev. | 0 | 1.29 | — | — | — | — | — | 9.1 | 3.78 | 49.2 | 148 | 0.33 | — | 163 | 263 | 22.2 | 3.31 | — |
| | *N* obs. | 25 | 11 | 0 | 0 | 0 | 0 | 0 | 25 | 25 | 25 | 24 | 25 | 0 | 25 | 25 | 25 | 2 | 0 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| I109.5D | Mean | 1.4 | 1.61 | 0.01 | — | — | — | — | 14.3 | 10.7 | 99 | 550 | 8.3 | — | 56 | 66.7 | 18.7 | 123 | — |
| | Median | 1.1 | 1.33 | 0 | — | — | — | — | 11.8 | 11.2 | 100 | 547 | 8.3 | — | 41 | 60.5 | 19 | 143 | — |
| | Minimum | 0.8 | 1.05 | 0 | — | — | — | — | 0 | 4 | 55 | 491 | 7.7 | — | 15 | 40.4 | 13 | 67.4 | — |
| | Maximum | 4.4 | 4.6 | 0.08 | — | — | — | — | 31 | 20 | 155 | 663 | 8.8 | — | 230 | 99.1 | 24 | 157 | — |
| | Std. dev. | 0.9 | 0.89 | 0.02 | — | — | — | — | 10.2 | 3.6 | 22.5 | 36.4 | 0.32 | — | 50.8 | 29.8 | 5.51 | 48.4 | — |
| | *N* obs. | 24 | 24 | 21 | — | — | — | — | 24 | 24 | 24 | 23 | 23 | — | 22 | 3 | 3 | 3 | 0 |
| I113.0T | Mean | 3.38 | 3.6 | 0.17 | — | — | — | — | 14.7 | 9.56 | 87 | 723 | 7.8 | — | 82 | — | — | — | — |
| | Median | 2.85 | 3.08 | 0.15 | — | — | — | — | 14.9 | 8.9 | 90 | 715 | 7.8 | — | 73 | — | — | — | — |
| | Minimum | 1.2 | 1.4 | 0.06 | — | — | — | — | 0.8 | 3.8 | 51 | 569 | 7.5 | — | 34 | — | — | — | — |
| | Maximum | 9.2 | 9.45 | 0.4 | — | — | — | — | 30.7 | 15.4 | 108 | 892 | 8.1 | — | 300 | — | — | — | — |
| | Std. dev. | 1.9 | 1.91 | 0.11 | — | — | — | — | 10.9 | 3.66 | 15.3 | 86.1 | 0.19 | — | 54.4 | — | — | — | — |
| | *N* obs. | 22 | 22 | 12 | — | — | — | — | 22 | 22 | 22 | 21 | 21 | — | 21 | 0 | 0 | 0 | 0 |
| I122.6Y | Mean | 2.5 | 2.72 | 0.13 | — | — | — | — | 11.7 | 10.6 | 93 | 621 | 7.9 | — | 70 | 61.7 | 9.9 | 5.99 | — |
| | Median | 1.95 | 2.15 | 0.09 | — | — | — | — | 7.9 | 11.8 | 94 | 637 | 7.9 | — | 46 | 61.7 | 9.9 | 5.99 | — |
| | Minimum | 0.7 | 0.9 | 0 | — | — | — | — | 0.8 | 5.1 | 66 | 505 | 7.5 | — | 10 | 61.7 | 9.9 | 5.99 | — |
| | Maximum | 6.5 | 6.7 | 0.44 | — | — | — | — | 28.3 | 14.6 | 129 | 799 | 8.6 | — | 280 | 61.7 | 9.9 | 5.99 | — |
| | Std. dev. | 1.72 | 1.72 | 0.12 | — | — | — | — | 9.54 | 2.94 | 13.5 | 76.8 | 0.25 | — | 70.2 | — | — | — | — |
| | *N* obs. | 22 | 22 | 15 | — | — | — | — | 21 | 21 | 21 | 21 | 21 | — | 18 | 1 | 1 | 1 | 0 |
| **1996 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I080.2C | Mean | 0.2 | 5.43 | 1.16 | — | — | — | — | 12 | 9.96 | 87 | 768 | 7.8 | 21.5 | 129 | 149 | 15.9 | 27.3 | — |
| | Median | 0.2 | 5.2 | 1.16 | — | — | — | — | 10.5 | 10.1 | 91 | 776 | 7.8 | 20.5 | 68 | 67.6 | 11 | 24.9 | — |
| | Minimum | 0.2 | 3.85 | 1.1 | — | — | — | — | 0.2 | 5.1 | 55 | 510 | 7.3 | 5 | 27 | 34 | 6.1 | 2.14 | — |
| | Maximum | 0.2 | 9.75 | 1.22 | — | — | — | — | 28.3 | 14.2 | 104 | 955 | 8.4 | 35 | 1500 | 1774 | 125 | 69.9 | — |
| | Std. dev. | 0 | 1.42 | 0.08 | — | — | — | — | 9.93 | 3.17 | 12.9 | 124 | 0.28 | 6.39 | 287 | 341 | 22.9 | 17.4 | — |
| | *N* obs. | 26 | 13 | 2 | 0 | 0 | 0 | 0 | 25 | 25 | 25 | 25 | 25 | 22 | 25 | 25 | 25 | 25 | 0 |
| I080.2M | Mean | 0.19 | 6.75 | 1.17 | — | — | — | — | 12.9 | 9.85 | 89 | 757 | 7.9 | 23.4 | 64 | 74.6 | 11 | 26.3 | 15.1 |
| | Median | 0.2 | 6.55 | 1.17 | — | — | — | — | 12.3 | 9.35 | 92 | 770 | 7.8 | 22 | 63 | 66.4 | 11 | 21.5 | 15.1 |
| | Minimum | 0 | 5.2 | 1.03 | — | — | — | — | 0.5 | 5.9 | 59 | 509 | 7.6 | 18 | 30 | 27.1 | 5.2 | 1.71 | 15.1 |
| | Maximum | 0.2 | 11 | 1.3 | — | — | — | — | 27.2 | 14 | 105 | 963 | 8.4 | 38 | 120 | 156 | 15.6 | 65.6 | 15.1 |
| | Std. dev. | 0.04 | 1.49 | 0.19 | — | — | — | — | 9.52 | 3.03 | 11.6 | 121 | 0.26 | 4.92 | 20.9 | 37.9 | 2.76 | 17.5 | — |
| | *N* obs. | 22 | 15 | 2 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 1 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| I109.5D | Mean | 0.2 | 1.45 | 0.02 | 100 | 7 | — | — | 12.9 | 13 | 122 | 554 | 8.3 | 30.5 | 43 | 36.2 | 13.5 | 79.2 | 118 |
| | Median | 0.2 | 1.2 | 0 | 100 | 7 | — | — | 11.1 | 13.1 | 108 | 556 | 8.4 | 30 | 38 | 28.9 | 12.2 | 59.6 | 118 |
| | Minimum | 0.2 | 0.7 | 0 | 100 | 4 | — | — | 0.7 | 5.7 | 71 | 456 | 7.4 | 15 | 14 | 11.9 | -0.1 | 7.95 | 118 |
| | Maximum | 0.2 | 4 | 0.14 | 100 | 10 | — | — | 29.5 | 25 | 334 | 614 | 9 | 70 | 125 | 110 | 24.3 | 221 | 118 |
| | Std. dev. | 0 | 0.65 | 0.04 | 0 | 2.75 | — | — | 10.1 | 3.94 | 49.9 | 38.3 | 0.37 | 13.2 | 25.8 | 22.9 | 5.72 | 56.3 | — |
| | *N* obs. | 27 | 27 | 20 | 4 | 4 | 0 | 0 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 27 | 1 |
| I113.0T | Mean | 0.2 | 3.22 | 0.59 | — | — | — | — | 13.7 | 10.2 | 92 | 769 | 7.9 | 23.8 | 66 | 72.2 | 10.6 | 29.1 | 5.16 |
| | Median | 0.2 | 2.85 | 0.39 | — | — | — | — | 13 | 9.65 | 93 | 749 | 7.9 | 23 | 67 | 64.5 | 10.3 | 22.5 | 5.16 |
| | Minimum | 0.2 | 1.3 | 0.06 | — | — | — | — | 0.6 | 5.8 | 70 | 461 | 7.2 | 17 | 42 | 47.1 | -0.1 | 3.42 | 5.16 |
| | Maximum | 0.2 | 6 | 3 | — | — | — | — | 28 | 14.9 | 109 | 1011 | 8.4 | 30 | 125 | 160 | 18.5 | 79.8 | 5.16 |
| | Std. dev. | 0 | 1.21 | 0.82 | — | — | — | — | 9.41 | 3.09 | 12.3 | 140 | 0.3 | 4.55 | 17.5 | 25 | 3.29 | 18.1 | — |
| | *N* obs. | 26 | 25 | 15 | 0 | 0 | 0 | 0 | 25 | 24 | 24 | 25 | 25 | 24 | 25 | 25 | 25 | 25 | 1 |
| I121.2W | Mean | 0.2 | 2.68 | — | 95 | 8 | — | — | 13.3 | 10.3 | 94 | 795 | 7.9 | 23.7 | 60 | 70.6 | 11.3 | 27.8 | 6.08 |
| | Median | 0.2 | 2.48 | — | 95 | 8 | — | — | 14.2 | 9.6 | 94 | 785 | 7.9 | 23.5 | 61 | 68.7 | 11.1 | 22.5 | 6.08 |
| | Minimum | 0.2 | 0.5 | — | 95 | 8 | — | — | 0.1 | 5.3 | 67 | 465 | 7.4 | 17 | 30 | 36 | 5.7 | -1 | 6.08 |
| | Maximum | 0.2 | 7 | — | 95 | 8 | — | — | 27.8 | 15.6 | 111 | 1073 | 8.5 | 36 | 110 | 148 | 19.6 | 83.4 | 6.08 |
| | Std. dev. | 0 | 1.39 | — | — | — | — | — | 10 | 2.94 | 10.5 | 154 | 0.29 | 5.03 | 18 | 27.5 | 3.62 | 20.4 | — |
| | *N* obs. | 27 | 26 | 0 | 1 | 1 | 0 | 0 | 27 | 27 | 27 | 27 | 27 | 26 | 26 | 27 | 27 | 27 | 1 |
| I122.6Y | Mean | 0.2 | 1.94 | 0.17 | — | — | — | — | 13.8 | 10.7 | 101 | 583 | 7.9 | 32.8 | 44 | 40.6 | 8.3 | 27.3 | 11.3 |
| | Median | 0.2 | 1.3 | 0.12 | — | — | — | — | 15.3 | 10.3 | 95 | 542 | 7.9 | 30.5 | 41 | 35.8 | 7.2 | 17.8 | 11.3 |
| | Minimum | 0.2 | 0.6 | 0 | — | — | — | — | 0.3 | 6.6 | 79 | 380 | 7.4 | 12 | 12 | 9.5 | 2.1 | -1 | 11.3 |
| | Maximum | 0.2 | 6 | 0.59 | — | — | — | — | 28.1 | 14.7 | 191 | 852 | 8.8 | 70 | 83 | 89.7 | 27.2 | 163 | 11.3 |
| | Std. dev. | 0 | 1.42 | 0.2 | — | — | — | — | 9.73 | 2.63 | 23.5 | 126 | 0.35 | 13.7 | 19.9 | 18.7 | 4.7 | 34.4 | — |
| | *N* obs. | 26 | 26 | 16 | 0 | 0 | 0 | 0 | 25 | 25 | 25 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 1 |
| I157.8D | Mean | 0.2 | 22 | — | 90 | 10 | — | — | 12.4 | 10.9 | 97 | 816 | 7.9 | 24.5 | 56 | 63.4 | 11.3 | 33.8 | 7.37 |
| | Median | 0.2 | 22.4 | — | 90 | 10 | — | — | 13.1 | 10 | 99 | 777 | 7.9 | 23 | 55 | 50.6 | 10.4 | 30 | 7.37 |
| | Minimum | 0.2 | 17 | — | 90 | 10 | — | — | 0.1 | 6.5 | 61 | 509 | 7.2 | 12 | 29 | 22.6 | 4.5 | 2.57 | 7.37 |
| | Maximum | 0.2 | 27.5 | — | 90 | 10 | — | — | 28 | 16.2 | 127 | 1092 | 8.5 | 41 | 140 | 163 | 22.3 | 90.4 | 7.37 |
| | Std. dev. | 0 | 2.87 | — | — | — | — | — | 9.86 | 3.1 | 13.2 | 150 | 0.28 | 7.82 | 22.3 | 35.3 | 4.22 | 25.3 | — |
| | *N* obs. | 25 | 16 | 0 | 1 | 1 | 0 | 0 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 24 | 1 |
| LM00.5M | Mean | 0.2 | 5.65 | — | 100 | 5 | — | — | 12.3 | 10.5 | 96 | 543 | 7.8 | 36.5 | 47 | 37.8 | 7.7 | — | 13.3 |
| | Median | 0.2 | 5.2 | — | 100 | 7 | — | — | 11.9 | 11 | 95 | 552 | 7.9 | 34 | 28 | 31.3 | 7.3 | — | 13.3 |
| | Minimum | 0.2 | 4 | — | 100 | 2 | — | — | 0.1 | 5 | 54 | 314 | 7 | 10 | 12 | 2.4 | 2.1 | — | 13.3 |
| | Maximum | 0.2 | 11 | — | 100 | 7 | — | — | 25.7 | 14.1 | 140 | 721 | 8.3 | 90 | 192 | 156 | 15.4 | — | 13.3 |
| | Std. dev. | 0 | 1.83 | — | 0 | 2.89 | — | — | 9.61 | 2.67 | 22.1 | 96.2 | 0.32 | 21.6 | 50.9 | 35.4 | 4 | — | — |
| | *N* obs. | 21 | 17 | 0 | 3 | 3 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 20 | 0 | 1 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements:** | | | | | | | | | | | | | | | | | | | |
| LM07.2M | Mean | 0.2 | 3.81 | — | 100 | 15 | — | — | 12 | 10.4 | 94 | 551 | 7.7 | 6.5 | 510 | 480 | 38.4 | — | 21.1 |
| | Median | 0.2 | 3.6 | — | 100 | 15 | — | — | 12.5 | 10.9 | 94 | 550 | 7.8 | 6.5 | 46 | 52.6 | 9.5 | — | 21.1 |
| | Minimum | 0.2 | 2.8 | — | 100 | 10 | — | — | 0 | 5.7 | 54 | 157 | 7.1 | 3 | 13 | 3.1 | 2.1 | — | 21.1 |
| | Maximum | 0.2 | 5.8 | — | 100 | 20 | — | — | 27 | 13.9 | 143 | 952 | 8.3 | 10 | 5550 | 7347 | 460 | — | 21.1 |
| | Std. dev. | 0 | 0.82 | — | 0 | 7.07 | — | — | 9.34 | 2.5 | 18.6 | 141 | 0.29 | 4.95 | 1379 | 1502 | 98.2 | — | — |
| | *N* obs. | 26 | 19 | 0 | 2 | 2 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 2 | 25 | 26 | 26 | 0 | 1 |
| MK04.4M | Mean | 0.2 | 1.06 | — | 100 | 4 | 100 | 1 | 12.6 | 11.4 | 106 | 654 | 7.9 | — | 58 | 86.1 | 10.5 | — | 36.9 |
| | Median | 0.2 | 0.9 | — | 100 | 4 | 100 | 1 | 12.6 | 12 | 102 | 659 | 7.9 | — | 20 | 30.7 | 6.4 | — | 36.9 |
| | Minimum | 0.2 | 0.4 | — | 100 | 4 | 100 | 1 | 0.2 | 6.7 | 58 | 513 | 7.3 | — | 4 | 1.1 | 2 | — | 36.9 |
| | Maximum | 0.2 | 2 | — | 100 | 4 | 100 | 1 | 27.6 | 15.1 | 176 | 707 | 8.3 | — | 370 | 987 | 73.8 | — | 36.9 |
| | Std. dev. | 0 | 0.49 | — | — | — | — | — | 8.85 | 2.32 | 21.1 | 43.5 | 0.25 | — | 96.6 | 190 | 14.7 | — | — |
| | *N* obs. | 27 | 23 | 0 | 1 | 1 | 1 | 1 | 27 | 27 | 27 | 27 | 27 | 0 | 26 | 27 | 26 | 0 | 1 |
| QV04.6M | Mean | 0.2 | 0.36 | — | — | — | — | — | 12.1 | 9.54 | 88 | 558 | 7.7 | 33 | 35 | 42.5 | 6.6 | — | 6.09 |
| | Median | 0.2 | 0.35 | — | — | — | — | — | 13.1 | 9.2 | 89 | 555 | 7.7 | 35 | 14 | 7.8 | 2.8 | — | 6.09 |
| | Minimum | 0.2 | 0.3 | — | — | — | — | — | 2.3 | 5.2 | 46 | 519 | 7.4 | 25 | 4 | 1.4 | 1.5 | — | 6.09 |
| | Maximum | 0.2 | 0.5 | — | — | — | — | — | 21.1 | 12.5 | 100 | 609 | 8.2 | 40 | 300 | 489 | 52.2 | — | 6.09 |
| | Std. dev. | 0 | 0.05 | — | — | — | — | — | 5.58 | 1.64 | 9.66 | 24.7 | 0.22 | 5.7 | 59.7 | 95.8 | 10.4 | — | — |
| | *N* obs. | 27 | 27 | 0 | 0 | 0 | 0 | 0 | 27 | 27 | 27 | 27 | 27 | 5 | 26 | 27 | 25 | 0 | 1 |
| S000.2K | Mean | 0.2 | 3.13 | — | 100 | 9 | 100 | 2 | 12.3 | 10.5 | 94 | 676 | 7.8 | 43.1 | 104 | 101 | 12.6 | — | 7.96 |
| | Median | 0.2 | 2.63 | — | 100 | 9 | 100 | 2 | 11.4 | 10.9 | 93 | 698 | 7.8 | 28 | 49 | 44.6 | 8.4 | — | 7.96 |
| | Minimum | 0.2 | 1.55 | — | 100 | 6 | 100 | 2 | 0 | 5.6 | 69 | 363 | 7.1 | 5 | 6 | 3.2 | 1.3 | — | 7.96 |
| | Maximum | 0.2 | 6.9 | — | 100 | 12 | 100 | 2 | 28.1 | 15.9 | 124 | 903 | 8.5 | 150 | 1100 | 1055 | 68.6 | — | 7.96 |
| | Std. dev. | 0 | 1.46 | — | 0 | 2.58 | — | — | 10.2 | 2.94 | 13.8 | 132 | 0.33 | 38.5 | 212 | 202 | 13.3 | — | — |
| | *N* obs. | 27 | 26 | 0 | 4 | 4 | 1 | 1 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 0 | 1 |
| SG16.2C | Mean | 0.2 | 1.46 | — | — | — | — | — | 12.2 | 12.6 | 119 | 773 | 7.9 | — | 103 | 199 | 16.3 | — | 74.9 |
| | Median | 0.2 | 1 | — | — | — | — | — | 11.1 | 12.4 | 101 | 760 | 7.9 | — | 35 | 37.1 | 7.4 | — | 74.9 |
| | Minimum | 0.2 | 0.5 | — | — | — | — | — | 0.1 | 7.3 | 80 | 419 | 7.5 | — | 4 | 2.3 | 2.2 | — | 74.9 |
| | Maximum | 0.2 | 4.4 | — | — | — | — | — | 26.8 | 25 | 316 | 1107 | 8.8 | — | 1400 | 3492 | 166 | — | 74.9 |
| | Std. dev. | 0 | 1.06 | — | — | — | — | — | 9.07 | 4.33 | 60.3 | 183 | 0.34 | — | 270 | 676 | 31.6 | — | — |
| | *N* obs. | 26 | 17 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 0 | 26 | 26 | 26 | 0 | 1 |

**Table E-1.** Continued.

| Sampling location | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-bottom measurements:** | | | | | | | | | | | | | | | | | | | |
| I109.5D | Mean | 1.28 | 1.5 | 0 | — | — | — | — | 13.1 | 11.1 | 101 | 556 | 8.3 | — | 50 | — | — | — | — |
| | Median | 1 | 1.2 | 0 | — | — | — | — | 11.5 | 12.5 | 98 | 552 | 8.4 | — | 49 | — | — | — | — |
| | Minimum | 0.7 | 0.95 | 0 | — | — | — | — | 1.4 | 5.6 | 67 | 465 | 7.5 | — | 21 | — | — | — | — |
| | Maximum | 3.8 | 4 | 0.04 | — | — | — | — | 29.1 | 18.1 | 172 | 628 | 9 | — | 87 | — | — | — | — |
| | Std. dev. | 0.67 | 0.67 | 0.01 | — | — | — | — | 9.55 | 3.71 | 23.9 | 41.6 | 0.36 | — | 21.6 | — | — | — | — |
| | *N* obs. | 24 | 24 | 18 | — | — | — | — | 24 | 24 | 24 | 24 | 24 | — | 22 | 0 | 0 | 0 | 0 |
| I113.0T | Mean | 2.87 | 3.09 | 0.19 | — | — | — | — | 12.3 | 10.7 | 93 | 796 | 7.9 | — | 75 | — | — | — | — |
| | Median | 2.6 | 2.8 | 0.16 | — | — | — | — | 11.9 | 10.4 | 96 | 783 | 8 | — | 71 | — | — | — | — |
| | Minimum | 1.1 | 1.3 | 0.06 | — | — | — | — | 0.6 | 5.7 | 72 | 541 | 7.1 | — | 45 | — | — | — | — |
| | Maximum | 5.8 | 6 | 0.42 | — | — | — | — | 28 | 14.8 | 109 | 1013 | 8.4 | — | 131 | — | — | — | — |
| | Std. dev. | 1.17 | 1.17 | 0.12 | — | — | — | — | 9.44 | 2.99 | 11.6 | 130 | 0.3 | — | 22.6 | — | — | — | — |
| | *N* obs. | 21 | 21 | 11 | — | — | — | — | 21 | 20 | 20 | 21 | 21 | — | 21 | 0 | 0 | 0 | 0 |
| I122.6Y | Mean | 2.21 | 2.43 | 0.18 | — | — | — | — | 13.7 | 10.1 | 94 | 606 | 7.9 | — | 47 | — | — | — | — |
| | Median | 1.6 | 1.85 | 0.12 | — | — | — | — | 15.3 | 9.1 | 92 | 548 | 7.8 | — | 46 | — | — | — | — |
| | Minimum | 0.8 | 1 | 0 | — | — | — | — | 0.3 | 6.1 | 69 | 394 | 7.4 | — | 17 | — | — | — | — |
| | Maximum | 5.8 | 6 | 0.48 | — | — | — | — | 27.6 | 13.9 | 114 | 850 | 8.3 | — | 86 | — | — | — | — |
| | Std. dev. | 1.45 | 1.45 | 0.17 | — | — | — | — | 10 | 2.63 | 12.3 | 147 | 0.28 | — | 19 | — | — | — | — |
| | *N* obs. | 18 | 18 | 9 | — | — | — | — | 18 | 18 | 18 | 18 | 18 | — | 17 | 0 | 0 | 0 | 0 |

**Table E-2**. Annual summaries (1993–1996) of chemical measurements at fixed sites grouped into near-surface (less than or equal to 0.2 m below the surface) and near-bottom (less than or equal to 0.2 m above the substrate) categories. Below-surface chemical samples are infrequently collected.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements:** | | | | | | | | | | | | | |
| I080.2M | Mean | 5.21 | 0.07 | 4.22 | 0.26 | 0.14 | 3.97 | 69.1 | 3.28 | — | — | 28.4 | — |
| | Median | 4.66 | 0.07 | 3.98 | 0.24 | 0.15 | 4.21 | 70 | 3.24 | — | — | 29.4 | — |
| | Minimum | 2.31 | -0.02 | 2.03 | 0.2 | 0.065 | 1.5 | 59.1 | 2.5 | — | — | 18.1 | — |
| | Maximum | 7.79 | 0.1 | 6.94 | 0.47 | 0.21 | 5.09 | 82.4 | 4.14 | — | — | 39.4 | — |
| | Std. dev. | 1.466 | 0.04 | 1.372 | 0.071 | 0.035 | 0.898 | 9.191 | 0.54 | — | — | 6.292 | — |
| | *N* obs. | 16 | 17 | 17 | 16 | 17 | 17 | 5 | 11 | 0 | 0 | 13 | 0 |
| I113.0T | Mean | 5.35 | 0.1 | 4.02 | 0.3 | 0.17 | 3.58 | 67.6 | 3.58 | — | — | 32.9 | — |
| | Median | 5.26 | 0.1 | 3.72 | 0.28 | 0.16 | 3.95 | 69.5 | 3.74 | — | — | 32.8 | — |
| | Minimum | 3.34 | -0.02 | 2.07 | 0.18 | 0.085 | 0.85 | 54.7 | 2.8 | — | — | 25.8 | — |
| | Maximum | 8.24 | 0.2 | 6.39 | 0.51 | 0.24 | 4.68 | 82.2 | 4.5 | — | — | 42.8 | — |
| | Std. dev. | 1.286 | 0.04 | 1.227 | 0.089 | 0.036 | 1.1 | 10.2 | 0.563 | — | — | 5.978 | — |
| | *N* obs. | 17 | 18 | 18 | 17 | 18 | 17 | 5 | 11 | 0 | 0 | 13 | 0 |
| I121.2W | Mean | 5.31 | 0.1 | 4.14 | 0.27 | 0.17 | 3.41 | 65 | 3.64 | — | — | 37.1 | — |
| | Median | 5.26 | 0.1 | 3.97 | 0.25 | 0.16 | 3.66 | 65.2 | 3.5 | — | — | 36.6 | — |
| | Minimum | 3.4 | 0.02 | 2.06 | 0.14 | 0.087 | 0.73 | 39 | 2.9 | — | — | 26 | — |
| | Maximum | 7.15 | 0.4 | 6.09 | 0.4 | 0.3 | 4.59 | 84.1 | 4.76 | — | — | 57 | — |
| | Std. dev. | 0.934 | 0.079 | 1.151 | 0.062 | 0.047 | 0.97 | 13.76 | 0.595 | — | — | 7.271 | — |
| | *N* obs. | 20 | 22 | 22 | 20 | 22 | 22 | 9 | 15 | 0 | 0 | 14 | 0 |
| I122.6Y | Mean | 4.96 | 0.1 | 3.9 | 0.21 | 0.13 | 3.64 | 64.5 | 3.2 | — | — | 30.8 | — |
| | Median | 4.31 | 0.09 | 3.72 | 0.22 | 0.13 | 3.6 | 65.6 | 3.1 | — | — | 30.7 | — |
| | Minimum | 3.06 | -0.02 | 2.05 | 0.13 | 0.059 | 0.89 | 48 | 2.6 | — | — | 15.8 | — |
| | Maximum | 7.93 | 0.4 | 6.14 | 0.29 | 0.25 | 5.57 | 88.8 | 4.1 | — | — | 40.7 | — |
| | Std. dev. | 1.339 | 0.087 | 1.256 | 0.038 | 0.049 | 1.094 | 12.7 | 0.449 | — | — | 6.532 | — |
| | *N* obs. | 19 | 22 | 22 | 20 | 22 | 22 | 9 | 15 | 0 | 0 | 14 | 0 |
| I157.8D | Mean | 5.34 | 0.1 | 4.28 | 0.32 | 0.19 | 3.6 | 70 | 3.52 | — | — | 37.2 | — |
| | Median | 5.09 | 0.1 | 3.79 | 0.32 | 0.19 | 3.76 | 70.8 | 3.43 | — | — | 39.5 | — |
| | Minimum | 3.19 | -0.02 | 2.36 | 0.2 | 0.084 | 1.39 | 56 | 2.1 | — | — | 18.4 | — |
| | Maximum | 7.99 | 0.2 | 6.69 | 0.51 | 0.39 | 5.49 | 79.8 | 4.68 | — | — | 58.5 | — |
| | Std. dev. | 1.291 | 0.053 | 1.268 | 0.078 | 0.066 | 0.946 | 9.784 | 0.789 | — | — | 10.1 | — |
| | *N* obs. | 15 | 17 | 17 | 15 | 17 | 17 | 5 | 11 | 0 | 0 | 13 | 0 |
| LM00.5M | Mean | 4.46 | 0.1 | 3.64 | 0.15 | 0.063 | 6.11 | 63.5 | 3.14 | — | — | 23.6 | — |
| | Median | 4.57 | 0.08 | 3.34 | 0.13 | 0.062 | 6.29 | 65.4 | 2.72 | — | — | 21.6 | — |
| | Minimum | 3.16 | 0.04 | 3.08 | 0.076 | 0.026 | 5.19 | 44 | 2.2 | — | — | 16.7 | — |
| | Maximum | 5.7 | 0.2 | 4.39 | 0.31 | 0.1 | 7.07 | 76.1 | 4.48 | — | — | 40.1 | — |
| | Std. dev. | 0.79 | 0.069 | 0.505 | 0.081 | 0.031 | 0.666 | 12.19 | 0.925 | — | — | 7.547 | — |
| | *N* obs. | 7 | 7 | 7 | 7 | 7 | 7 | 5 | 6 | 0 | 0 | 7 | 0 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements:** | | | | | | | | | | | | | |
| MK04.4M | Mean | 7.83 | 0.06 | 7.76 | 0.26 | 0.088 | 4.33 | 85.8 | 1.76 | — | — | 18.7 | — |
| | Median | 7.55 | 0.06 | 8.3 | 0.15 | 0.062 | 4.45 | 80 | 1.5 | — | — | 19.2 | — |
| | Minimum | 1.83 | -0.02 | 2.28 | 0.044 | 0.013 | 1.04 | 75 | 1.2 | — | — | 6.73 | — |
| | Maximum | 13.9 | 0.1 | 12.5 | 0.92 | 0.25 | 5.73 | 103 | 3.5 | — | — | 28.1 | — |
| | Std. dev. | 3.048 | 0.033 | 2.894 | 0.248 | 0.066 | 1.191 | 12.44 | 0.675 | — | — | 5.39 | — |
| | *N* obs. | 17 | 18 | 18 | 17 | 18 | 18 | 5 | 11 | 0 | 0 | 14 | 0 |
| QV04.6M | Mean | 2.95 | 0.06 | 2.08 | 0.12 | 0.05 | 6.92 | 78.7 | 1.57 | — | — | 9.96 | — |
| | Median | 3.08 | 0.06 | 1.99 | 0.085 | 0.036 | 7.1 | 78.7 | 1.26 | — | — | 9.7 | — |
| | Minimum | 1.91 | -0.02 | 0.87 | 0.043 | -0.01 | 3.21 | 71.8 | 1 | — | — | 2.81 | — |
| | Maximum | 4.38 | 0.2 | 3.17 | 0.48 | 0.2 | 7.82 | 91.5 | 3 | — | — | 13.9 | — |
| | Std. dev. | 0.668 | 0.041 | 0.605 | 0.103 | 0.045 | 1.009 | 7.87 | 0.717 | — | — | 2.591 | — |
| | *N* obs. | 17 | 18 | 18 | 17 | 18 | 18 | 5 | 11 | 0 | 0 | 14 | 0 |
| S000.2K | Mean | 6.94 | 0.09 | 5.56 | 0.42 | 0.094 | 4.57 | 72.8 | 2.44 | — | — | 16.8 | — |
| | Median | 6.94 | 0.07 | 6.13 | 0.18 | 0.097 | 4.6 | 78.2 | 2.22 | — | — | 17.6 | — |
| | Minimum | 4.65 | -0.02 | 1.96 | 0.042 | 0.023 | 2.4 | 28.6 | 1.7 | — | — | 8.91 | — |
| | Maximum | 9.22 | 0.5 | 8.81 | 2 | 0.16 | 5.98 | 94.3 | 3.7 | — | — | 24.4 | — |
| | Std. dev. | 1.392 | 0.096 | 1.961 | 0.542 | 0.041 | 0.89 | 20.21 | 0.656 | — | — | 5.253 | — |
| | *N* obs. | 20 | 22 | 22 | 20 | 22 | 22 | 9 | 15 | 0 | 0 | 14 | 0 |
| SG16.2C | Mean | 6.38 | 0.1 | 5.67 | 0.37 | 0.15 | 4.46 | 67.3 | 2.66 | — | — | 26.1 | — |
| | Median | 6.34 | 0.07 | 6.12 | 0.27 | 0.14 | 4.7 | 69 | 2.48 | — | — | 25 | — |
| | Minimum | 4.42 | -0.02 | 1.94 | 0.13 | 0.061 | 2.5 | 36 | 1.7 | — | — | 11.7 | — |
| | Maximum | 8.78 | 0.6 | 8.31 | 1.97 | 0.32 | 5.81 | 87 | 5.1 | — | — | 51.1 | — |
| | Std. dev. | 1.232 | 0.139 | 1.725 | 0.393 | 0.054 | 0.886 | 14.75 | 0.981 | — | — | 9.296 | — |
| | *N* obs. | 20 | 21 | 21 | 20 | 21 | 21 | 9 | 15 | 0 | 0 | 13 | 0 |
| **1994 Near-surface measurements:** | | | | | | | | | | | | | |
| I080.2C | Mean | 4.21 | 0.2 | 3.17 | 0.31 | 0.11 | 2.56 | 61.9 | 4.35 | 26.5 | 39.7 | 58.9 | 66.7 |
| | Median | 4.25 | 0.1 | 3.44 | 0.3 | 0.084 | 2.31 | 59.8 | 4.17 | 26.3 | 41.9 | 53.5 | 62.9 |
| | Minimum | 2.65 | -0.02 | 0.5 | 0.13 | -0.01 | 0.54 | 46.2 | 2.43 | 20.7 | 13.5 | 31.1 | 48.2 |
| | Maximum | 6.2 | 0.7 | 5.96 | 0.47 | 0.26 | 4.77 | 95.1 | 7.29 | 39.6 | 80.2 | 121 | 95.8 |
| | Std. dev. | 1.132 | 0.161 | 1.467 | 0.091 | 0.073 | 1.268 | 12 | 1.167 | 4.549 | 15.63 | 23.04 | 11.17 |
| | *N* obs. | 25 | 25 | 25 | 25 | 24 | 24 | 25 | 25 | 25 | 25 | 24 | 21 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements:** | | | | | | | | | | | | | |
| I080.2M | Mean | 4.16 | 0.2 | 3.43 | 0.27 | 0.1 | 2.63 | 63.2 | 4.45 | 26.7 | 40.1 | 53.4 | 61.1 |
| | Median | 3.89 | 0.1 | 3.63 | 0.26 | 0.089 | 2.48 | 59.5 | 3.87 | 25.5 | 42.2 | 48.9 | 63.7 |
| | Minimum | 2.8 | 0.03 | 0.62 | 0.13 | 0.019 | 0.54 | 49.8 | 2.55 | 21.3 | 15.9 | 12.2 | 26.7 |
| | Maximum | 6.37 | 0.7 | 6.2 | 0.53 | 0.22 | 4.68 | 97.2 | 14.5 | 41.1 | 75.5 | 120 | 91.3 |
| | Std. dev. | 1.037 | 0.147 | 1.497 | 0.089 | 0.053 | 1.207 | 12.37 | 2.375 | 4.37 | 13.92 | 24.53 | 15.7 |
| | *N* obs. | 21 | 23 | 23 | 22 | 22 | 22 | 23 | 23 | 22 | 22 | 22 | 20 |
| I109.5D | Mean | 2.42 | 0.01 | 0.15 | 0.68 | 0.31 | 2.96 | 42 | 3.24 | 23.6 | 30.4 | 50.2 | 38.2 |
| | Median | 2.18 | -0.02 | -0.01 | 0.62 | 0.22 | 2.57 | 40.3 | 3.45 | 23.6 | 29.5 | 49.6 | 32.1 |
| | Minimum | 0.93 | -0.02 | -0.01 | 0.032 | 0.019 | 0.22 | 30.7 | 2.22 | 20.2 | 16.5 | 38.4 | 9.62 |
| | Maximum | 4.17 | 0.05 | 1.61 | 1.51 | 0.96 | 7.69 | 63.8 | 3.78 | 27.1 | 37.2 | 61.9 | 85.5 |
| | Std. dev. | 1.017 | 0.01 | 0.385 | 0.44 | 0.295 | 2.257 | 7.714 | 0.497 | 1.697 | 5.275 | 6.455 | 20.3 |
| | *N* obs. | 17 | 17 | 17 | 17 | 16 | 16 | 17 | 17 | 17 | 17 | 16 | 16 |
| I113.0T | Mean | 4.01 | 0.2 | 3.3 | 0.35 | 0.13 | 2.64 | 63.8 | 4.28 | 27.1 | 48.2 | 103 | 70.7 |
| | Median | 3.85 | 0.2 | 3.26 | 0.3 | 0.11 | 2.11 | 60.2 | 4.32 | 25.5 | 45.5 | 59.8 | 70.1 |
| | Minimum | 2.62 | 0.04 | 0.66 | 0.17 | -0.01 | 0.2 | 49.1 | 2.64 | 20.7 | 23.5 | 37.5 | 47.9 |
| | Maximum | 6.85 | 0.9 | 6.29 | 0.89 | 0.37 | 6.8 | 98.6 | 6.54 | 42.7 | 104 | 995 | 95.6 |
| | Std. dev. | 1.038 | 0.216 | 1.508 | 0.161 | 0.096 | 1.577 | 14.29 | 0.901 | 5.704 | 16.55 | 191.1 | 11.26 |
| | *N* obs. | 24 | 25 | 25 | 24 | 24 | 24 | 25 | 25 | 24 | 24 | 24 | 21 |
| I121.2W | Mean | 4.23 | 0.2 | 3.42 | 0.36 | 0.15 | 2.47 | 64.6 | 4.37 | 27.4 | 47.1 | 65.7 | 70.2 |
| | Median | 4.21 | 0.1 | 3.45 | 0.32 | 0.11 | 2.16 | 61.3 | 4.35 | 25.9 | 46.3 | 60.2 | 70.1 |
| | Minimum | 2.84 | -0.02 | 0.13 | 0.13 | 0.027 | 0.086 | 40.6 | 2.31 | 16.3 | 11.3 | 12.2 | 46.8 |
| | Maximum | 6.39 | 0.8 | 6.02 | 0.8 | 0.38 | 4.43 | 95.7 | 6.36 | 41.9 | 103 | 146 | 101 |
| | Std. dev. | 1.106 | 0.2 | 1.583 | 0.161 | 0.099 | 1.311 | 15.46 | 0.852 | 6.683 | 19.35 | 25.88 | 12.66 |
| | *N* obs. | 25 | 26 | 26 | 25 | 25 | 25 | 26 | 26 | 25 | 25 | 25 | 21 |
| I122.6Y | Mean | 2.84 | 0.2 | 2.13 | 0.2 | 0.06 | 4.66 | 66.7 | 2.64 | 26.5 | 20.2 | 76.8 | 54.6 |
| | Median | 2.54 | 0.06 | 1.52 | 0.19 | 0.039 | 4.62 | 65.6 | 2.37 | 25.3 | 9.19 | 20.3 | 52.9 |
| | Minimum | 1.02 | -0.02 | 0.43 | 0.041 | -0.01 | 0.92 | 43.9 | 0.81 | 20.5 | 3.32 | 6.88 | 35.3 |
| | Maximum | 4.94 | 0.9 | 4.58 | 0.4 | 0.31 | 7.69 | 94.8 | 6.48 | 38.2 | 58.4 | 1140 | 86.6 |
| | Std. dev. | 1.118 | 0.256 | 1.284 | 0.098 | 0.073 | 1.901 | 11.08 | 1.388 | 4.286 | 17.74 | 227.8 | 13.41 |
| | *N* obs. | 24 | 24 | 24 | 24 | 24 | 24 | 25 | 25 | 24 | 24 | 24 | 21 |
| I157.8D | Mean | 4.09 | 0.2 | 3.29 | 0.36 | 0.16 | 2.34 | 64.5 | 4.53 | 27 | 50.3 | 69.5 | 74.7 |
| | Median | 3.89 | 0.1 | 3.52 | 0.32 | 0.16 | 1.89 | 61.9 | 4.41 | 24.6 | 47.3 | 63.2 | 72.1 |
| | Minimum | 1.83 | -0.02 | 0.61 | 0.12 | 0.045 | 0.089 | 43.7 | 2.07 | 17.7 | 18.6 | 41 | 50.4 |
| | Maximum | 6.32 | 0.9 | 5.68 | 0.89 | 0.39 | 4.37 | 101 | 6.96 | 42.7 | 94.7 | 138 | 110 |
| | Std. dev. | 1.102 | 0.216 | 1.418 | 0.171 | 0.09 | 1.219 | 15.38 | 1.037 | 6.328 | 15.39 | 22.69 | 13.74 |
| | *N* obs. | 24 | 25 | 25 | 24 | 24 | 24 | 25 | 25 | 24 | 24 | 24 | 21 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements:** | | | | | | | | | | | | | |
| LM00.5M | Mean | 2.97 | 0.1 | 2.33 | 0.24 | 0.027 | 3.43 | 64.2 | 3.83 | 25.4 | 15.2 | 19.5 | 66.1 |
| | Median | 2.12 | 0.1 | 2.18 | 0.16 | 0.023 | 3.14 | 58.7 | 3.45 | 23.7 | 12.4 | 17.3 | 61 |
| | Minimum | 0.99 | -0.02 | -0.01 | 0.054 | -0.01 | 0.14 | 34.2 | 2 | 12.8 | 7.4 | 1.66 | 4.65 |
| | Maximum | 6.52 | 0.4 | 5.69 | 1.38 | 0.072 | 6.02 | 122 | 9.3 | 46.9 | 45 | 46.5 | 330 |
| | Std. dev. | 1.71 | 0.1 | 2.029 | 0.285 | 0.021 | 1.793 | 19.57 | 1.813 | 7.732 | 7.949 | 9.522 | 63.13 |
| | *N* obs. | 22 | 23 | 23 | 22 | 22 | 22 | 23 | 23 | 22 | 22 | 22 | 21 |
| LM07.2M | Mean | 3.22 | 0.1 | 2.41 | 0.24 | 0.025 | 3.6 | 62.8 | 3.73 | 25.1 | 14.6 | 20.5 | 63.1 |
| | Median | 3.45 | 0.05 | 2.52 | 0.16 | 0.021 | 3.6 | 64.2 | 3.45 | 25.2 | 13.5 | 18.5 | 53.3 |
| | Minimum | 1.09 | -0.02 | -0.01 | 0.042 | -0.01 | 0.15 | 30.8 | 1.65 | 11.3 | 6.63 | 12 | 31.9 |
| | Maximum | 6.62 | 0.3 | 5.55 | 1.17 | 0.068 | 6.17 | 95.1 | 9.45 | 43.1 | 20.9 | 39.1 | 220 |
| | Std. dev. | 1.636 | 0.098 | 1.981 | 0.265 | 0.019 | 1.839 | 15.7 | 1.761 | 6.991 | 3.782 | 6.488 | 38.6 |
| | *N* obs. | 25 | 25 | 25 | 25 | 24 | 24 | 25 | 25 | 25 | 25 | 24 | 21 |
| MK04.4M | Mean | 4.25 | 0.1 | 3.89 | 0.16 | 0.055 | 4.11 | 74.3 | 2.28 | 33.5 | 13.9 | 26.4 | 50.7 |
| | Median | 2.98 | 0.05 | 2.47 | 0.088 | 0.012 | 4.62 | 72.9 | 2.04 | 34.3 | 11.8 | 24 | 44 |
| | Minimum | 1.47 | -0.02 | -0.01 | 0.011 | -0.01 | 0.99 | 48.6 | 1.17 | 19.7 | 5.08 | 15.3 | 35 |
| | Maximum | 9.9 | 1.3 | 8.18 | 1.05 | 0.76 | 5.75 | 102 | 5.85 | 46.2 | 28.6 | 59.6 | 93.6 |
| | Std. dev. | 2.544 | 0.258 | 2.886 | 0.238 | 0.152 | 1.331 | 14.66 | 1.184 | 5.222 | 5.796 | 9.545 | 17.33 |
| | *N* obs. | 25 | 26 | 26 | 25 | 25 | 25 | 26 | 26 | 25 | 25 | 25 | 21 |
| QV04.6M | Mean | 2.14 | 0.04 | 1.54 | 0.088 | 0.015 | 6.39 | 75.3 | 1.45 | 28.1 | 5.97 | 10.2 | 51.2 |
| | Median | 1.46 | 0.03 | 1.08 | 0.051 | -0.01 | 7.23 | 76.8 | 1.17 | 28.8 | 5.15 | 8.39 | 48 |
| | Minimum | 0.98 | -0.02 | 0.71 | 0.016 | -0.01 | 0.59 | 39.1 | 0.75 | 13.1 | 3.27 | 5.48 | 25.9 |
| | Maximum | 8.99 | 0.2 | 6.95 | 0.32 | 0.046 | 8.29 | 99.1 | 5.28 | 37.5 | 28.2 | 18.5 | 89.9 |
| | Std. dev. | 1.704 | 0.049 | 1.296 | 0.076 | 0.015 | 1.969 | 10.83 | 0.945 | 4.505 | 4.732 | 4 | 13.65 |
| | *N* obs. | 25 | 26 | 26 | 25 | 25 | 25 | 26 | 26 | 25 | 25 | 25 | 21 |
| S000.2K | Mean | 4.36 | 0.05 | 3.96 | 0.15 | 0.022 | 3.5 | 78.8 | 2.64 | 38.9 | 20.5 | 24.1 | 102 |
| | Median | 4.84 | 0.05 | 4.71 | 0.13 | 0.026 | 3.43 | 81 | 2.52 | 37.2 | 17.7 | 22.6 | 96.2 |
| | Minimum | 0.97 | -0.02 | -0.01 | 0.063 | -0.01 | 0.14 | 36.8 | 1.38 | 24.6 | 9.99 | 14.2 | 61.3 |
| | Maximum | 7.08 | 0.1 | 8.18 | 0.43 | 0.057 | 6.2 | 115 | 6.78 | 53.9 | 41.9 | 41.7 | 194 |
| | Std. dev. | 2.052 | 0.039 | 2.755 | 0.087 | 0.016 | 2.033 | 19.8 | 1.139 | 6.228 | 8.247 | 6.375 | 32.56 |
| | *N* obs. | 25 | 26 | 26 | 25 | 25 | 25 | 26 | 26 | 25 | 25 | 25 | 21 |
| SG16.2C | Mean | 4.22 | 0.07 | 3.35 | 0.31 | 0.089 | 3.46 | 62.1 | 4 | 28.5 | 35 | 38.8 | 64.6 |
| | Median | 4.33 | 0.05 | 3.57 | 0.3 | 0.066 | 3.4 | 61.2 | 3.48 | 27.5 | 23.1 | 32.9 | 57.3 |
| | Minimum | 1.58 | -0.02 | -0.01 | 0.043 | -0.01 | 0.68 | 40.2 | 1.8 | 16.9 | 6.29 | 14.5 | 22.9 |
| | Maximum | 6.65 | 0.4 | 7.12 | 0.81 | 0.32 | 5.74 | 99.3 | 9.15 | 45.6 | 75.1 | 66.6 | 201 |
| | Std. dev. | 1.684 | 0.089 | 2.24 | 0.155 | 0.084 | 1.492 | 15.74 | 1.866 | 5.972 | 23.88 | 17.27 | 37.69 |
| | *N* obs. | 23 | 25 | 25 | 23 | 24 | 24 | 25 | 25 | 24 | 24 | 24 | 21 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-surface measurements:** | | | | | | | | | | | | | |
| I080.2C | Mean | 4.85 | 0.1 | 3.68 | 0.37 | 0.12 | 2.96 | 64.8 | 4.5 | 28 | 35.7 | 56.5 | 69 |
| | Median | 5.04 | 0.1 | 4.07 | 0.3 | 0.086 | 3.04 | 61.7 | 4.02 | 27.3 | 34.9 | 62.8 | 71 |
| | Minimum | 2.87 | 0.02 | 1.18 | 0.12 | 0.033 | 0.24 | 40.4 | 2.13 | 14.4 | 10.7 | 21.4 | 34.7 |
| | Maximum | 6.99 | 0.3 | 5.66 | 1.32 | 0.36 | 4.54 | 109 | 16.8 | 57.5 | 70.7 | 83.1 | 95.8 |
| | Std. dev. | 1.111 | 0.08 | 1.399 | 0.266 | 0.072 | 1.008 | 16.42 | 2.599 | 8.432 | 15.12 | 19.49 | 17.06 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 26 | 26 | 25 | 25 |
| I080.2M | Mean | 5.05 | 0.1 | 4.09 | 0.28 | 0.11 | 3.12 | 68.4 | 4.15 | 30 | 36.1 | 56.9 | 67.9 |
| | Median | 5.29 | 0.1 | 4.56 | 0.28 | 0.092 | 3.36 | 67.6 | 3.72 | 29.9 | 34.8 | 62.4 | 70 |
| | Minimum | 2.57 | 0.03 | 1.22 | 0.14 | 0.02 | 0.22 | 49.5 | 2.28 | 20.2 | 10.3 | 26.4 | 40.6 |
| | Maximum | 6.78 | 0.3 | 5.69 | 0.46 | 0.34 | 4.45 | 94.5 | 8.79 | 45.8 | 56.6 | 78.4 | 91.2 |
| | Std. dev. | 1.082 | 0.079 | 1.407 | 0.095 | 0.074 | 1.05 | 13.71 | 1.603 | 6.744 | 12.44 | 16.91 | 15.07 |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| I109.5D | Mean | 2.37 | 0.05 | 0.66 | 0.29 | 0.079 | 0.93 | 52.3 | 4.04 | 28.7 | 27.9 | 43.5 | 44.3 |
| | Median | 1.94 | 0.05 | -0.01 | 0.18 | 0.017 | 0.12 | 52.2 | 3.42 | 28.4 | 25.1 | 43.8 | 48.6 |
| | Minimum | 0.6 | -0.02 | -0.01 | 0.041 | -0.01 | -0.05 | 38.1 | 2.37 | 22.9 | 14.1 | 26 | 19 |
| | Maximum | 6.99 | 0.2 | 5.92 | 0.77 | 0.4 | 4.21 | 83.7 | 17.1 | 54.6 | 60.8 | 63 | 63.5 |
| | Std. dev. | 1.456 | 0.046 | 1.562 | 0.239 | 0.125 | 1.372 | 8.669 | 3.018 | 5.942 | 10.25 | 9.559 | 13.96 |
| | *N* obs. | 25 | 26 | 26 | 25 | 26 | 26 | 25 | 25 | 25 | 25 | 26 | 26 |
| I113.0T | Mean | 5.19 | 0.2 | 3.96 | 0.33 | 0.14 | 2.79 | 68.7 | 3.67 | 29.4 | 41.1 | 61.6 | 71.2 |
| | Median | 5.29 | 0.2 | 4.35 | 0.35 | 0.13 | 2.8 | 65.4 | 3.78 | 28.6 | 43.1 | 62.9 | 71.6 |
| | Minimum | 2.9 | 0.04 | 1.2 | 0.14 | 0.03 | 0.097 | 49.8 | 0.15 | 21.6 | 17.1 | 29.1 | 41.4 |
| | Maximum | 7.39 | 0.4 | 6.77 | 0.8 | 0.33 | 4.36 | 109 | 4.98 | 57 | 70.8 | 87 | 95.3 |
| | Std. dev. | 1.209 | 0.118 | 1.573 | 0.134 | 0.069 | 1.029 | 13.65 | 0.891 | 7.09 | 13.55 | 16.64 | 14.73 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| I121.2W | Mean | 5.15 | 0.2 | 3.94 | 0.32 | 0.15 | 2.7 | 70.1 | 4.09 | 29.7 | 43.5 | 64.3 | 72.9 |
| | Median | 5.49 | 0.2 | 4.35 | 0.32 | 0.15 | 2.77 | 64.9 | 3.96 | 28.6 | 45.8 | 66.9 | 70.7 |
| | Minimum | 2.87 | 0.04 | -0.01 | 0.14 | 0.019 | 1.09 | 50 | 1.86 | 21.7 | 15.7 | 29 | 42.4 |
| | Maximum | 6.72 | 0.6 | 6.12 | 0.77 | 0.35 | 3.96 | 101 | 7.05 | 43.3 | 77.9 | 91.2 | 102 |
| | Std. dev. | 1.071 | 0.124 | 1.667 | 0.136 | 0.072 | 0.95 | 13.76 | 0.927 | 5.529 | 13.14 | 16.91 | 15.32 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| I122.6Y | Mean | 4.12 | 0.1 | 2.83 | 0.19 | 0.054 | 4.47 | 72.5 | 2.69 | 29.7 | 22.2 | 31.7 | 53.6 |
| | Median | 3.5 | 0.08 | 2.03 | 0.18 | 0.037 | 3.95 | 72.5 | 2.85 | 29.6 | 20.5 | 28.9 | 49.8 |
| | Minimum | 1.51 | -0.02 | 0.68 | 0.029 | -0.01 | 1.31 | 54.4 | 0.96 | 23.6 | 3.82 | 8.45 | 38.9 |
| | Maximum | 11.1 | 0.7 | 6.28 | 0.42 | 0.27 | 7.9 | 99.7 | 7.65 | 50.4 | 51.4 | 74.8 | 81.5 |
| | Std. dev. | 2.16 | 0.141 | 1.911 | 0.105 | 0.055 | 1.984 | 10.2 | 1.477 | 5.297 | 15.38 | 20.78 | 10.29 |
| | *N* obs. | 24 | 25 | 25 | 24 | 26 | 26 | 25 | 25 | 25 | 25 | 26 | 26 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-surface measurements:** | | | | | | | | | | | | | |
| I157.8D | Mean | 5.25 | 0.2 | 3.75 | 0.38 | 0.16 | 2.6 | 69 | 4.32 | 29.5 | 45.1 | 69.5 | 77.2 |
| | Median | 5.32 | 0.2 | 4.2 | 0.35 | 0.15 | 2.55 | 66.6 | 3.78 | 27.6 | 44.1 | 71.8 | 75.7 |
| | Minimum | 2.84 | 0.07 | 0.92 | 0.039 | 0.012 | 0.71 | 52.9 | 1.98 | 21.2 | 15.6 | 29.6 | 39.4 |
| | Maximum | 7.36 | 0.6 | 6.47 | 1.14 | 0.31 | 4.2 | 110 | 11.2 | 56.5 | 84 | 97.1 | 117 |
| | Std. dev. | 1.204 | 0.138 | 1.752 | 0.235 | 0.074 | 1.047 | 13.37 | 1.663 | 6.952 | 15.72 | 17.12 | 17.32 |
| | *N* obs. | 23 | 24 | 24 | 23 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LM00.5M | Mean | 3.91 | 0.09 | 2.98 | 0.25 | 0.047 | 4.75 | 58.6 | 3.73 | 23.2 | 16 | 20.8 | 52.5 |
| | Median | 3.45 | 0.06 | 2.92 | 0.15 | 0.032 | 4.99 | 59.2 | 3.24 | 22.4 | 12.9 | 20.7 | 50.6 |
| | Minimum | 1.86 | -0.02 | -0.01 | 0.037 | -0.01 | 1 | 32.4 | 2.34 | 10.6 | 4.49 | 10.2 | 22.3 |
| | Maximum | 7.42 | 0.2 | 5.75 | 1.55 | 0.14 | 6.57 | 86.1 | 6.51 | 35 | 72.3 | 32.5 | 85.4 |
| | Std. dev. | 1.49 | 0.065 | 1.675 | 0.331 | 0.04 | 1.369 | 15.17 | 1.296 | 7.054 | 14.52 | 6.594 | 19.06 |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| LM07.2M | Mean | 3.96 | 0.1 | 2.61 | 0.28 | 0.042 | 4.49 | 58.5 | 3.92 | 23.3 | 14.8 | 18.7 | 51.1 |
| | Median | 3.8 | 0.1 | 2.38 | 0.15 | 0.027 | 4.45 | 60 | 3.39 | 24.5 | 11.4 | 19.2 | 48.6 |
| | Minimum | 1.72 | 0.02 | 0.3 | 0.053 | -0.01 | 1.31 | 23.4 | 1.95 | 7.56 | 3.3 | 6.13 | 16.3 |
| | Maximum | 7.64 | 0.2 | 5.67 | 1.81 | 0.13 | 6.67 | 101 | 13.5 | 54.4 | 53.5 | 34.1 | 86 |
| | Std. dev. | 1.421 | 0.057 | 1.563 | 0.386 | 0.037 | 1.391 | 19.73 | 2.225 | 9.997 | 12.24 | 7.331 | 20.23 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| MK04.4M | Mean | 6.4 | 0.07 | 5.48 | 0.17 | 0.02 | 3.87 | 78.1 | 1.87 | 35.5 | 13.3 | 23.4 | 43.2 |
| | Median | 5.89 | 0.05 | 6.05 | 0.07 | -0.01 | 4 | 77.9 | 1.65 | 34.6 | 12.7 | 22.5 | 42.1 |
| | Minimum | 2.17 | -0.02 | 0.92 | 0.03 | -0.01 | 1.23 | 41.4 | -0.01 | 18.4 | 6.29 | 16.8 | 27.9 |
| | Maximum | 13.6 | 0.2 | 10.8 | 1.87 | 0.16 | 5.89 | 111 | 3.6 | 61.6 | 48.7 | 31.2 | 52.7 |
| | Std. dev. | 3.4 | 0.051 | 3.425 | 0.359 | 0.034 | 1.209 | 14.39 | 0.839 | 7.831 | 8.021 | 4.214 | 6.696 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| QV04.6M | Mean | 2.37 | 0.05 | 1.73 | 0.07 | 0.007 | 6.94 | 80.7 | 1.85 | 30.6 | 5.48 | 9.21 | 47.9 |
| | Median | 1.58 | 0.04 | 1 | 0.041 | -0.01 | 7.22 | 78.8 | 1.11 | 29.7 | 5.31 | 8.8 | 47.7 |
| | Minimum | 1.13 | -0.02 | 0.61 | 0.013 | -0.01 | 1.75 | 66.8 | 0.66 | 25.1 | 2.87 | 7.32 | 34.7 |
| | Maximum | 6.77 | 0.2 | 6.35 | 0.33 | 0.015 | 8.67 | 108 | 17.8 | 42.7 | 8.44 | 13.6 | 57.7 |
| | Std. dev. | 1.552 | 0.04 | 1.486 | 0.075 | 0.003 | 1.681 | 7.448 | 3.276 | 3.294 | 1.402 | 1.637 | 5.276 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| S000.2K | Mean | 5.45 | 0.08 | 4.45 | 0.27 | 0.023 | 3.58 | 79.1 | 3.13 | 37.6 | 17.5 | 25 | 90.8 |
| | Median | 5.89 | 0.06 | 4.93 | 0.12 | 0.016 | 3.77 | 81.6 | 2.37 | 38.7 | 16.5 | 22.9 | 87.6 |
| | Minimum | 1.74 | -0.02 | 0.021 | 0.04 | -0.01 | 0.17 | 45.4 | 1.56 | 19.5 | 8.3 | 12.5 | 42.7 |
| | Maximum | 8.55 | 0.2 | 8.29 | 1.85 | 0.08 | 6.17 | 116 | 16.8 | 52.8 | 29.2 | 61.3 | 148 |
| | Std. dev. | 1.966 | 0.062 | 2.278 | 0.405 | 0.02 | 1.626 | 18.41 | 2.9 | 9.1 | 5.301 | 9.316 | 24.39 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-surface measurements:** | | | | | | | | | | | | | |
| SG16.2C | Mean | 4.47 | 0.05 | 3.25 | 0.38 | 0.088 | 3.66 | 66 | 4 | 31.1 | 34.7 | 47.3 | 62.4 |
| | Median | 4.14 | 0.04 | 1.99 | 0.24 | 0.06 | 3.73 | 64.7 | 3.39 | 30.9 | 27.3 | 34.3 | 48.5 |
| | Minimum | 1.94 | -0.02 | 0.041 | 0.11 | -0.01 | 0.85 | 8.68 | 1.83 | 2.75 | 2.48 | 14.2 | 23.1 |
| | Maximum | 8.99 | 0.2 | 6.72 | 1.41 | 0.4 | 6 | 101 | 17.6 | 57.4 | 81.6 | 106 | 130 |
| | Std. dev. | 1.882 | 0.048 | 2.264 | 0.359 | 0.09 | 1.148 | 16.38 | 3.107 | 9.18 | 23.81 | 26.27 | 29.08 |
| | *N* obs. | 24 | 24 | 24 | 24 | 25 | 25 | 24 | 24 | 24 | 24 | 25 | 25 |
| **1996 Near-surface measurements:** | | | | | | | | | | | | | |
| I080.2C | Mean | 4.93 | 0.2 | 3.28 | 0.41 | 0.13 | 2.18 | 65.7 | 5.15 | 27.3 | 47.5 | 73.7 | 64.5 |
| | Median | 5.08 | 0.1 | 3.05 | 0.31 | 0.14 | 2.24 | 65 | 5.1 | 27.4 | 52.2 | 82 | 68.7 |
| | Minimum | 2.19 | -0.02 | -0.01 | 0.07 | 0.02 | 0.52 | 33.7 | 3.51 | 12.9 | 16.3 | 9.92 | 0.75 |
| | Maximum | 8.19 | 0.8 | 6.59 | 2.29 | 0.33 | 3.6 | 112 | 7.14 | 58.7 | 76.7 | 120 | 107 |
| | Std. dev. | 1.6 | 0.236 | 1.451 | 0.498 | 0.083 | 0.837 | 16.02 | 1.045 | 8.346 | 19.02 | 31.39 | 25.86 |
| | *N* obs. | 24 | 21 | 25 | 17 | 25 | 23 | 25 | 25 | 25 | 25 | 23 | 23 |
| I080.2M | Mean | 4.49 | 0.2 | 3.42 | 0.29 | 0.14 | 2.05 | 65.5 | 5.34 | 26.4 | 47.1 | 77.4 | 68.8 |
| | Median | 4.33 | 0.1 | 3.04 | 0.3 | 0.13 | 2.13 | 64.3 | 5.07 | 26.5 | 52.8 | 82.6 | 74.2 |
| | Minimum | -0.1 | -0.02 | 1.53 | 0.084 | 0.035 | 0.38 | 33.3 | 3.96 | 13.2 | 17.8 | 33.5 | 37.3 |
| | Maximum | 8.17 | 0.9 | 6.62 | 0.53 | 0.29 | 3.62 | 87.8 | 7.71 | 40.2 | 72.8 | 119 | 88.3 |
| | Std. dev. | 1.964 | 0.242 | 1.334 | 0.117 | 0.076 | 0.838 | 13.92 | 1.012 | 6.182 | 19.25 | 26.47 | 15.14 |
| | *N* obs. | 20 | 17 | 20 | 13 | 20 | 17 | 20 | 20 | 20 | 20 | 17 | 17 |
| I109.5D | Mean | 2.39 | 0.05 | 0.9 | 0.2 | 0.045 | 1.01 | 46.9 | 4.03 | 25 | 25 | 48 | 38.3 |
| | Median | 1.9 | 0.02 | -0.01 | 0.19 | 0.025 | 0.38 | 47.9 | 4.17 | 25.8 | 27 | 48.8 | 35.1 |
| | Minimum | 0.58 | -0.02 | -0.01 | 0.078 | -0.01 | -0.05 | 5.24 | 0.15 | 3.01 | 2.79 | 24.5 | 25.6 |
| | Maximum | 7.28 | 0.5 | 6.66 | 0.36 | 0.21 | 3.76 | 76.2 | 5.94 | 33.9 | 34 | 59.3 | 52 |
| | Std. dev. | 1.518 | 0.101 | 1.984 | 0.092 | 0.053 | 1.235 | 13.3 | 1.07 | 6.259 | 7.035 | 9.536 | 7.979 |
| | *N* obs. | 26 | 22 | 27 | 19 | 27 | 24 | 27 | 27 | 27 | 27 | 24 | 24 |
| I113.0T | Mean | 4.85 | 0.2 | 3.83 | 0.45 | 0.14 | 1.99 | 69.1 | 5.36 | 27.6 | 48 | 77.9 | 68.2 |
| | Median | 4.53 | 0.1 | 3.53 | 0.29 | 0.13 | 2.14 | 71.2 | 5.28 | 29.4 | 49 | 76.3 | 65.8 |
| | Minimum | 0.38 | -0.02 | 1.48 | 0.087 | 0.03 | 0.12 | 33.7 | 3.72 | 12.8 | 16.4 | 33.7 | 39 |
| | Maximum | 8.99 | 0.9 | 6.8 | 2.71 | 0.33 | 3.29 | 104 | 7.14 | 42.1 | 77.3 | 125 | 108 |
| | Std. dev. | 1.973 | 0.258 | 1.622 | 0.582 | 0.08 | 0.832 | 16.53 | 1.089 | 6.844 | 19.67 | 28.26 | 16.74 |
| | *N* obs. | 25 | 20 | 25 | 18 | 25 | 23 | 25 | 25 | 25 | 25 | 23 | 23 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements:** | | | | | | | | | | | | | |
| I121.2W | Mean | 4.88 | 0.3 | 3.67 | 0.32 | 0.16 | 1.98 | 71.2 | 5.2 | 28.6 | 52.2 | 85 | 70.1 |
| | Median | 4.89 | 0.1 | 3.48 | 0.29 | 0.17 | 1.92 | 73.9 | 5.4 | 29 | 53.3 | 81 | 66.2 |
| | Minimum | 1.29 | -0.02 | 0.83 | 0.12 | 0.037 | -0.05 | 34 | 1.5 | 12.8 | 15.2 | 33.2 | 0.99 |
| | Maximum | 8.66 | 0.9 | 6.9 | 0.56 | 0.45 | 3.49 | 111 | 7.47 | 57.8 | 88.3 | 147 | 121 |
| | Std. dev. | 1.828 | 0.306 | 1.611 | 0.118 | 0.103 | 0.923 | 16.06 | 1.193 | 8.381 | 21.68 | 33.96 | 24.74 |
| | *N* obs. | 27 | 22 | 27 | 19 | 27 | 24 | 27 | 27 | 27 | 27 | 24 | 24 |
| I122.6Y | Mean | 3.63 | 0.07 | 2.78 | 0.16 | 0.042 | 3.85 | 65.5 | 3.29 | 25.2 | 18.3 | 29.1 | 44.6 |
| | Median | 2.83 | 0.06 | 1.58 | 0.16 | 0.012 | 3.8 | 68.4 | 3.75 | 25 | 7.89 | 12.8 | 42.6 |
| | Minimum | 1.46 | -0.02 | 0.33 | 0.027 | -0.01 | 1.35 | 31 | 0.84 | 12.3 | 2.46 | 7.56 | 11.3 |
| | Maximum | 8.78 | 0.2 | 7.01 | 0.29 | 0.15 | 6.21 | 86.8 | 5.7 | 33.5 | 59.6 | 93.4 | 74.9 |
| | Std. dev. | 2.172 | 0.05 | 2.101 | 0.082 | 0.047 | 1.462 | 13.63 | 1.492 | 5.146 | 18.47 | 27.3 | 12.55 |
| | *N* obs. | 26 | 21 | 26 | 18 | 26 | 23 | 26 | 26 | 26 | 26 | 23 | 23 |
| I157.8D | Mean | 4.67 | 0.2 | 3.65 | 0.31 | 0.19 | 1.94 | 70.1 | 5.5 | 27.3 | 53.6 | 86.4 | 75.7 |
| | Median | 4.39 | 0.1 | 3.21 | 0.27 | 0.18 | 1.98 | 73.8 | 5.31 | 29 | 52.3 | 85.6 | 77.2 |
| | Minimum | 0.19 | -0.02 | 0.95 | 0.17 | 0.056 | -0.05 | 34.8 | 2.91 | 13.2 | 15.6 | 29.1 | 35.7 |
| | Maximum | 8.87 | 0.7 | 6.96 | 0.57 | 0.41 | 3.73 | 86.1 | 7.95 | 35.1 | 91.9 | 137 | 110 |
| | Std. dev. | 1.875 | 0.191 | 1.63 | 0.123 | 0.093 | 1.02 | 13.42 | 1.132 | 5.961 | 22.28 | 33.91 | 18.13 |
| | *N* obs. | 24 | 21 | 25 | 16 | 25 | 23 | 25 | 25 | 25 | 25 | 23 | 23 |
| LM00.5M | Mean | 3.32 | 0.1 | 2.1 | 0.16 | 0.043 | 3.13 | 60.3 | 4.68 | 22.5 | 13.7 | 24 | 53.6 |
| | Median | 2.88 | 0.03 | 1.62 | 0.11 | -0.01 | 3.07 | 64.9 | 4.35 | 24.5 | 13 | 19.9 | 55.6 |
| | Minimum | 0.8 | -0.02 | -0.01 | 0.07 | -0.01 | 1.13 | 32 | 2.94 | 10.8 | 5.33 | 15.3 | 29.5 |
| | Maximum | 6.58 | 0.9 | 5.85 | 0.39 | 0.43 | 4.98 | 86.2 | 9.69 | 31.7 | 28.1 | 44 | 84.4 |
| | Std. dev. | 1.957 | 0.219 | 1.912 | 0.106 | 0.094 | 1.063 | 15.11 | 1.482 | 5.947 | 6.609 | 8.543 | 17.32 |
| | *N* obs. | 19 | 17 | 20 | 13 | 20 | 17 | 20 | 20 | 20 | 20 | 17 | 17 |
| LM07.2M | Mean | 3.49 | 0.09 | 2.25 | 0.59 | 0.021 | 3.31 | 62.6 | 4.17 | 23.9 | 14.4 | 22.4 | 54.9 |
| | Median | 3.38 | 0.02 | 1.79 | 0.14 | -0.01 | 3.13 | 64.2 | 4.08 | 24.1 | 11.8 | 21.6 | 51.9 |
| | Minimum | 0.7 | -0.02 | -0.01 | 0.053 | -0.01 | 1.13 | 17.9 | 2.01 | 4.75 | 1.68 | 3.83 | 10.1 |
| | Maximum | 9.68 | 0.6 | 6.32 | 3.64 | 0.091 | 5.72 | 101 | 6.15 | 53.9 | 49.8 | 40.2 | 104 |
| | Std. dev. | 2.396 | 0.151 | 1.988 | 1.104 | 0.027 | 1.112 | 18.4 | 0.983 | 8.859 | 9.512 | 7.664 | 21.91 |
| | *N* obs. | 26 | 21 | 26 | 18 | 26 | 24 | 26 | 26 | 26 | 26 | 24 | 24 |
| MK04.4M | Mean | 5.32 | 0.05 | 4.16 | 0.13 | 0.01 | 3.03 | 77 | 2.62 | 33.9 | 14.5 | 30.1 | 37.8 |
| | Median | 4.72 | 0.03 | 3.18 | 0.066 | -0.01 | 2.94 | 79.2 | 2.55 | 34.8 | 14.5 | 28.1 | 36.8 |
| | Minimum | 0.77 | -0.02 | 0.61 | 0.028 | -0.01 | 1.22 | 37.1 | 1.29 | 19.6 | 7.04 | 17.2 | 7 |
| | Maximum | 16.8 | 0.2 | 13.2 | 0.7 | 0.036 | 5.19 | 94.6 | 5.64 | 42.2 | 28.2 | 43.1 | 50.8 |
| | Std. dev. | 4.135 | 0.06 | 3.435 | 0.158 | 0.008 | 0.974 | 11.86 | 0.938 | 4.767 | 4.991 | 6.455 | 8.82 |
| | *N* obs. | 26 | 22 | 26 | 19 | 27 | 25 | 27 | 27 | 27 | 27 | 25 | 25 |

**Table E-2.** Continued.

| Sampling location | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements:** | | | | | | | | | | | | | |
| QV04.6M | Mean | 2.15 | 0.03 | 1.5 | 0.12 | 0.008 | 5.96 | 73.9 | 1.63 | 26.7 | 5.09 | 10 | 41.9 |
| | Median | 1.39 | 0.03 | 0.84 | 0.049 | -0.01 | 6.32 | 74.7 | 1.53 | 26.5 | 4.39 | 8.81 | 43 |
| | Minimum | 0.9 | -0.02 | 0.59 | 0.011 | -0.01 | 2.78 | 7.61 | 0.63 | 2.76 | 0.42 | 7.77 | 2.95 |
| | Maximum | 9.09 | 0.09 | 6.91 | 0.9 | 0.03 | 7.6 | 106 | 4.59 | 51.3 | 38.1 | 18.7 | 50.9 |
| | Std. dev. | 1.979 | 0.023 | 1.587 | 0.199 | 0.006 | 1.386 | 18.38 | 0.878 | 8.448 | 6.741 | 2.629 | 9.286 |
| | *N* obs. | 26 | 22 | 27 | 19 | 27 | 25 | 27 | 27 | 27 | 27 | 25 | 25 |
| S000.2K | Mean | 3.99 | 0.1 | 2.88 | 0.22 | 0.029 | 1.98 | 74.3 | 3.81 | 36.3 | 21.2 | 28.2 | 86.8 |
| | Median | 3.97 | 0.04 | 2.65 | 0.13 | 0.011 | 1.73 | 75 | 3.72 | 37 | 20.2 | 27.8 | 93.4 |
| | Minimum | 0.19 | -0.02 | -0.01 | 0.017 | -0.01 | -0.05 | 23.1 | 1.74 | 16.3 | 4.57 | 9.75 | 11.3 |
| | Maximum | 9.08 | 1.1 | 7.67 | 1.17 | 0.36 | 4.84 | 122 | 7.86 | 70.1 | 57.4 | 47.9 | 136 |
| | Std. dev. | 2.639 | 0.246 | 2.58 | 0.266 | 0.068 | 1.599 | 21.62 | 1.329 | 11.54 | 12.09 | 9.505 | 33.99 |
| | *N* obs. | 27 | 22 | 27 | 19 | 27 | 26 | 27 | 27 | 27 | 27 | 26 | 26 |
| SG16.2C | Mean | 4.09 | 0.06 | 3.16 | 0.48 | 0.16 | 2.64 | 65.1 | 5.18 | 29.3 | 53.1 | 65.2 | 60.4 |
| | Median | 3.29 | 0.03 | 2.58 | 0.3 | 0.09 | 3.03 | 66.6 | 4.14 | 29.6 | 46.2 | 58.3 | 62.2 |
| | Minimum | 1.26 | -0.02 | -0.01 | 0.14 | -0.01 | 0.52 | 30.3 | 2.19 | 15 | 7.69 | 20.7 | 0.14 |
| | Maximum | 10.1 | 0.3 | 6.87 | 2.59 | 0.62 | 4.11 | 79.9 | 10.8 | 39.5 | 125 | 111 | 92.2 |
| | Std. dev. | 2.407 | 0.089 | 2.155 | 0.566 | 0.174 | 1.073 | 12.28 | 2.464 | 5.035 | 35.36 | 30.26 | 24.06 |
| | *N* obs. | 26 | 21 | 26 | 18 | 26 | 23 | 26 | 26 | 26 | 26 | 23 | 23 |

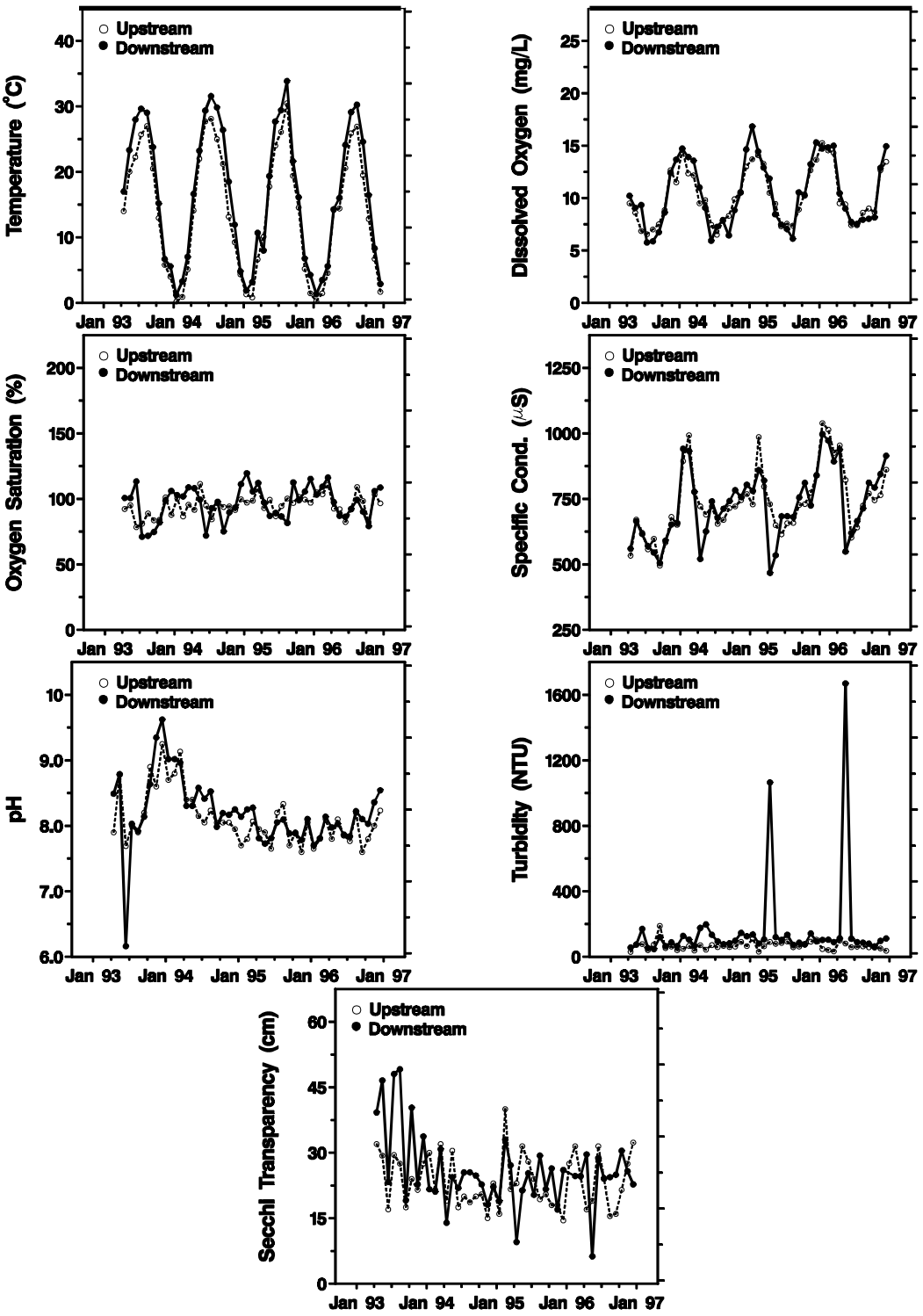


**Figure E-1a.** Monthly means of temperature (°C), dissolved oxygen (mg/L), oxygen saturation (%), pH, specific conductivity (µS), and turbidity (NTU) at sites in upper and lower La Grange Pool from 1993 through 1996.

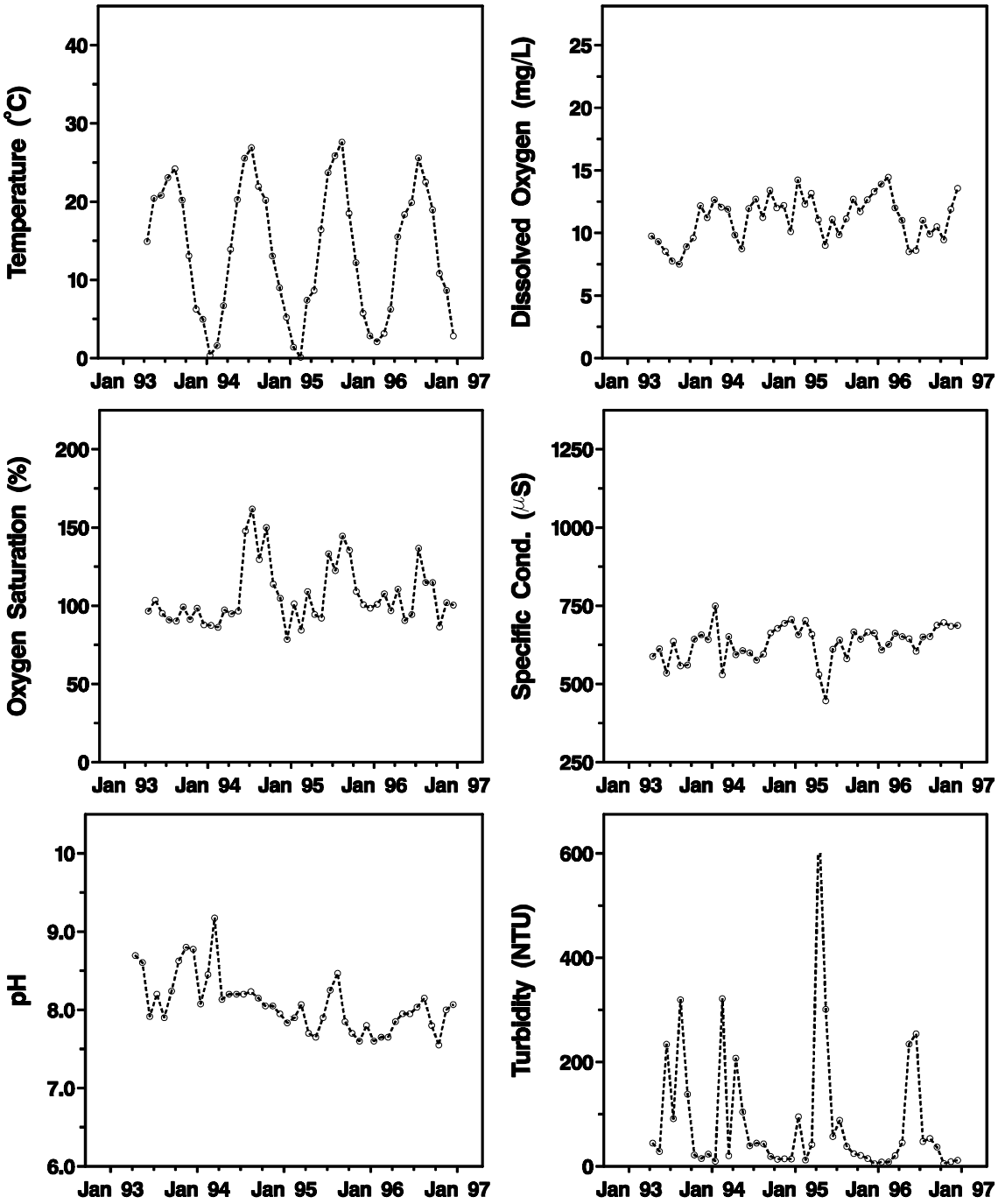


**Figure E-1b.** Monthly means of temperature (°C), dissolved oxygen (mg/L), oxygen saturation (%), pH, specific conductivity (µS), and turbidity (NTU) in the Mackinaw River from 1993 through 1996.

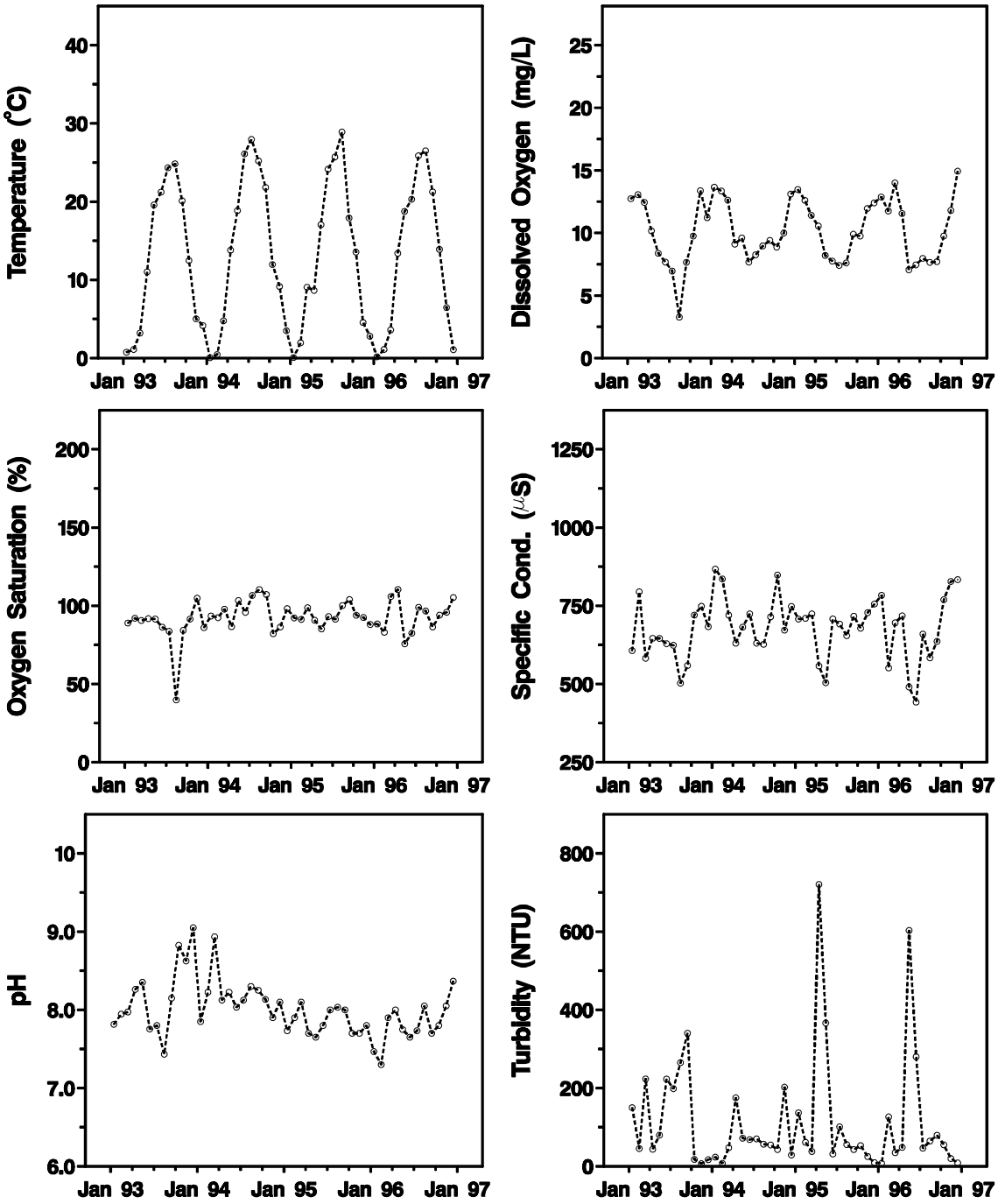


**Figure E-1c.** Monthly means of temperature (°C), dissolved oxygen (mg/L), oxygen saturation (%), pH, specific conductivity (µS), and turbidity (NTU) in the Spoon River from 1993 through 1996.

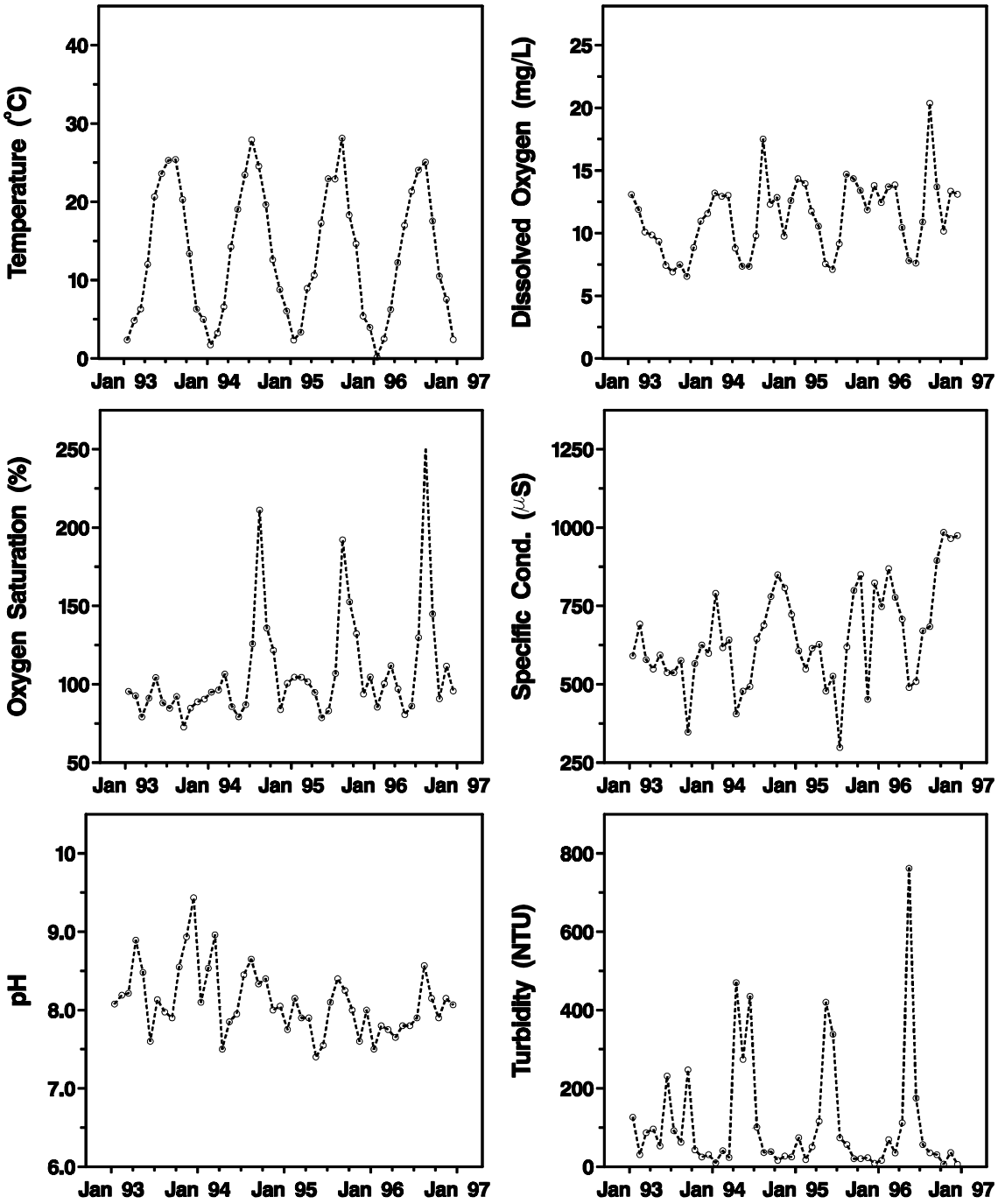


**Figure E-1d.** Monthly means of temperature (°C), dissolved oxygen (mg/L), oxygen saturation (%), pH, specific conductivity (µS), and turbidity (NTU) in the Sangamon River from 1993 through 1996.

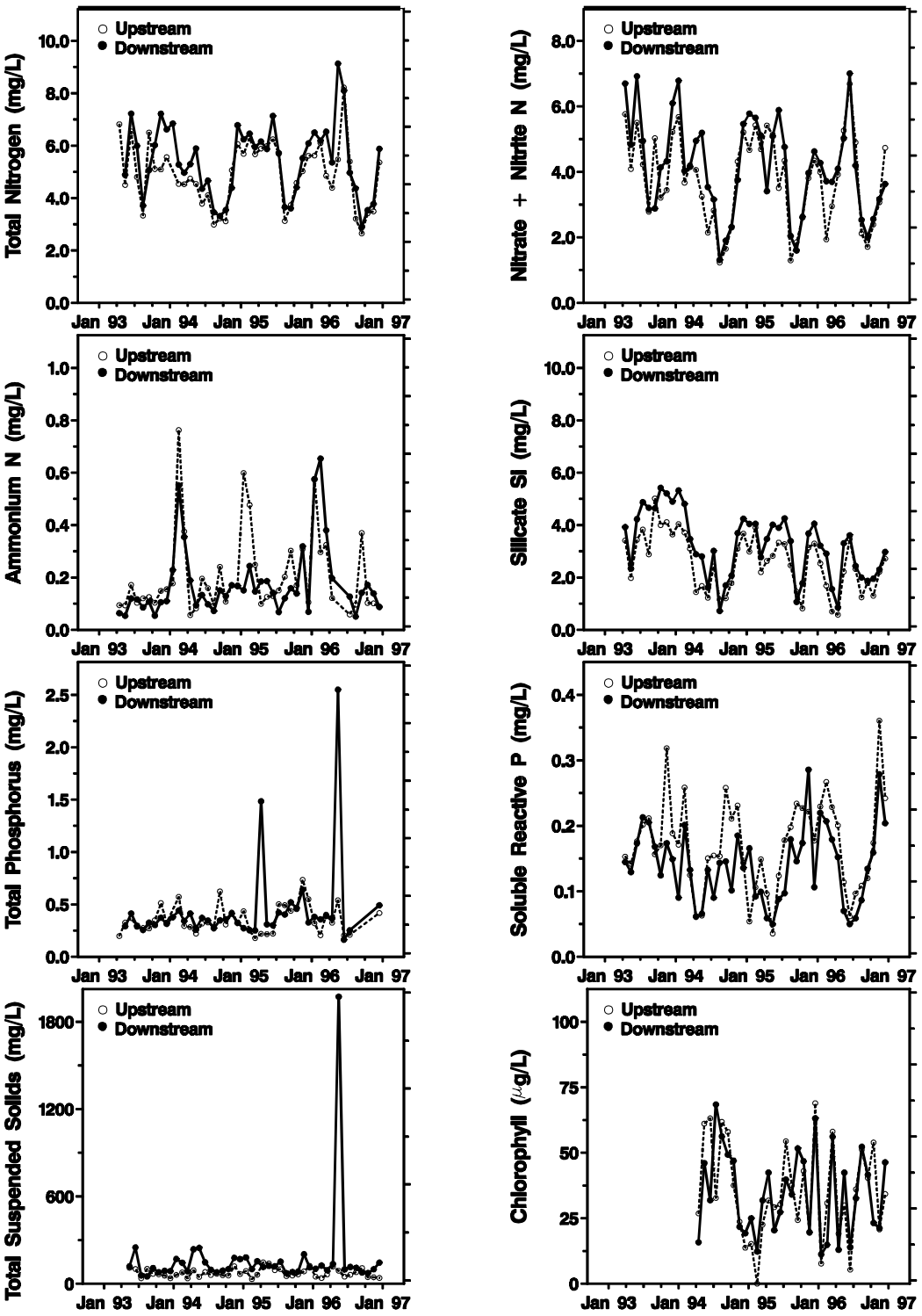


**Figure E-2a.** Monthly means of total nitrogen (mg/L), nitrate–nitrite nitrogen (mg/L), ammonium nitrogen (mg/L), silicate silicon (mg/L), total phosphorus (mg/L), soluble reactive phosphorus (mg/L), total suspended solids (mg/L), and chlorophyll *a* (µg/L) at sites in upper and lower La Grange Pool from 1993 through 1996.

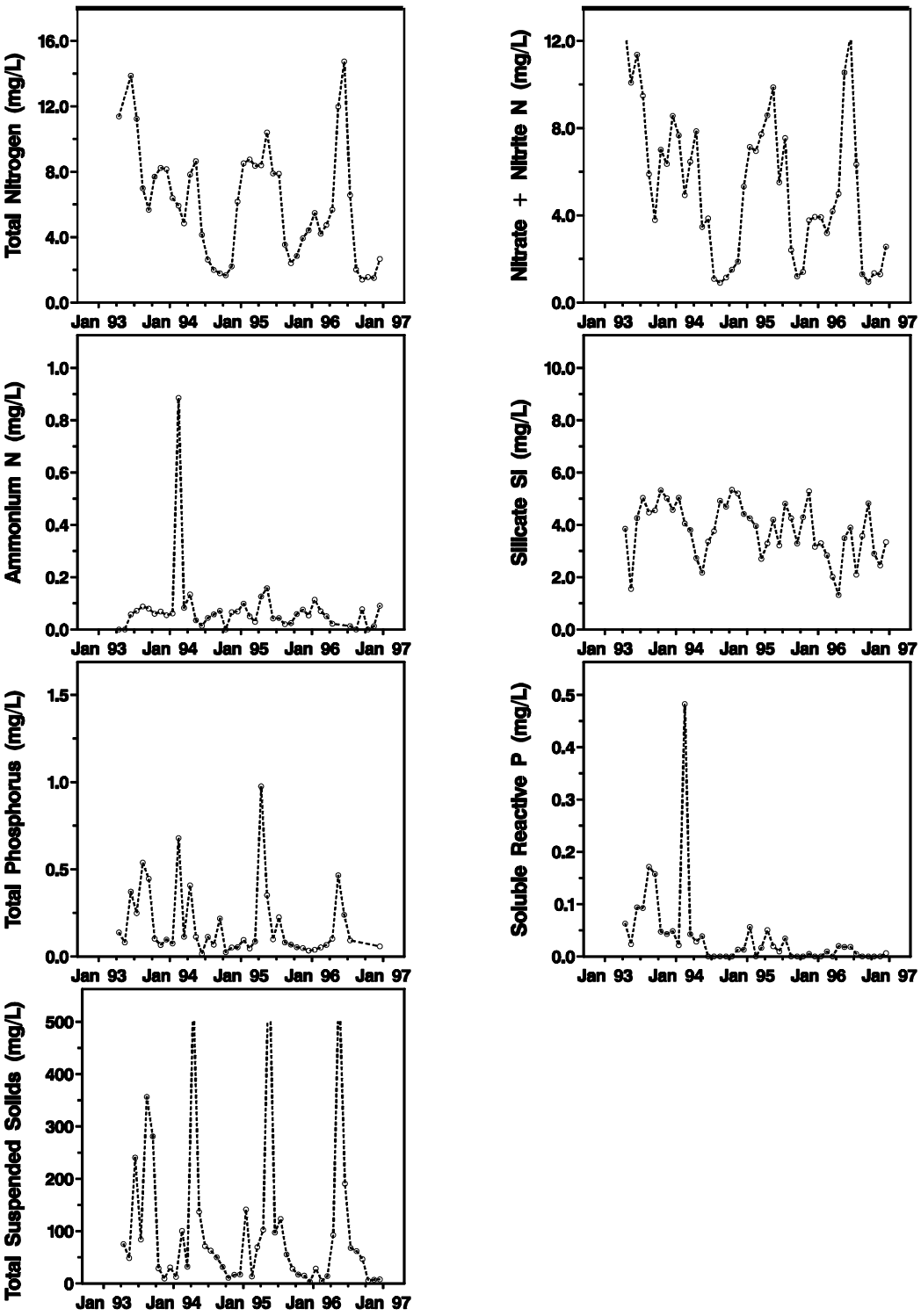


**Figure E-2b.** Monthly means of total nitrogen (mg/L), nitrate–nitrite nitrogen(mg/L), ammonium nitrogen (mg/L), silicate silicon (mg/L), total phosphorus (mg/L), soluble reactive phosphorus (mg/L), and total suspended solids (mg/L) in the Mackinaw River from 1993 through 1996.

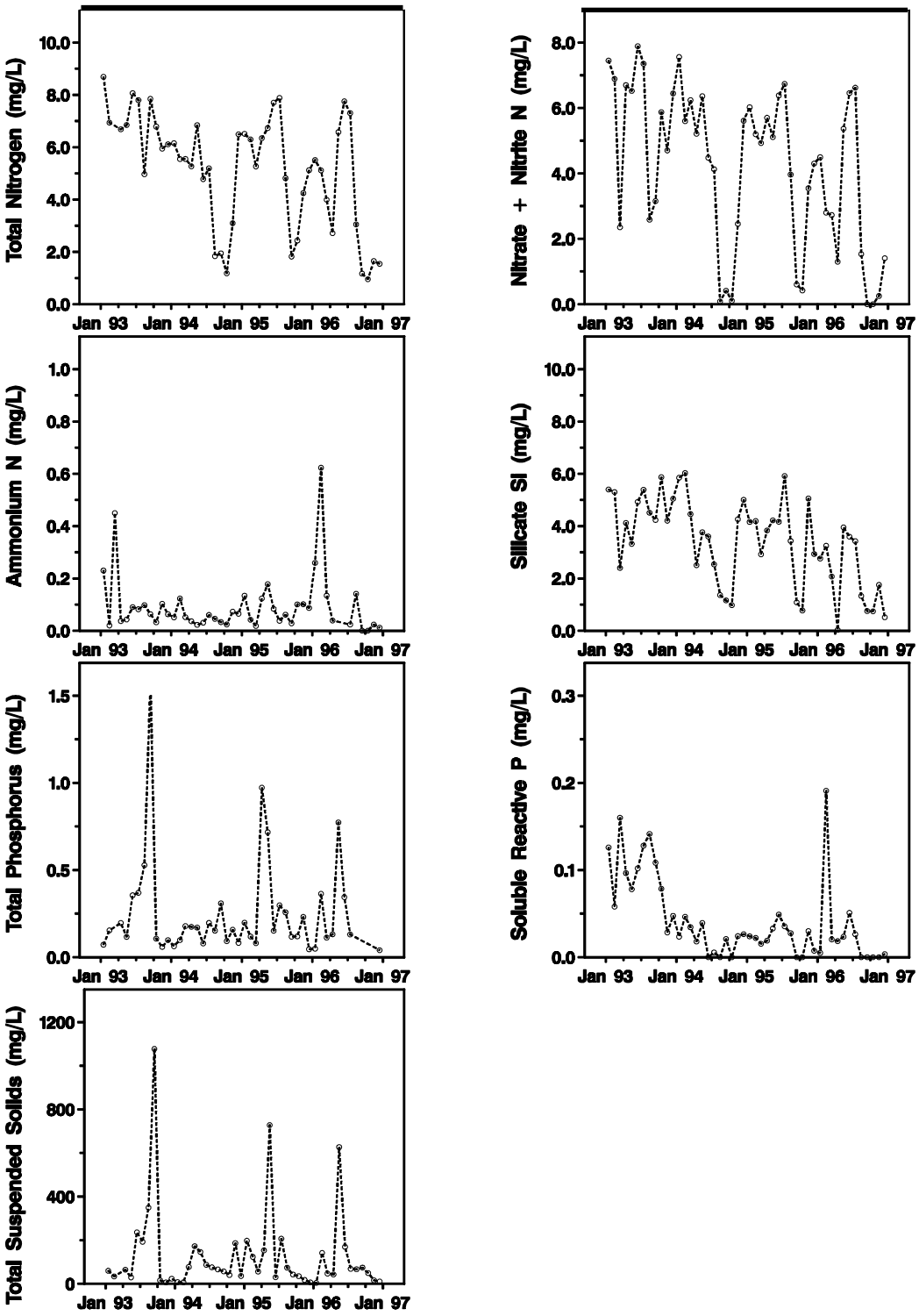


**Figure E-2c.** Monthly means of total nitrogen (mg/L), nitrate–nitrite nitrogen(mg/L), ammonium nitrogen (mg/L), silicate silicon (mg/L), total phosphorus (mg/L), soluble reactive phosphorus (mg/L), and total suspended solids (mg/L) in the Spoon River from 1993 through 1996.

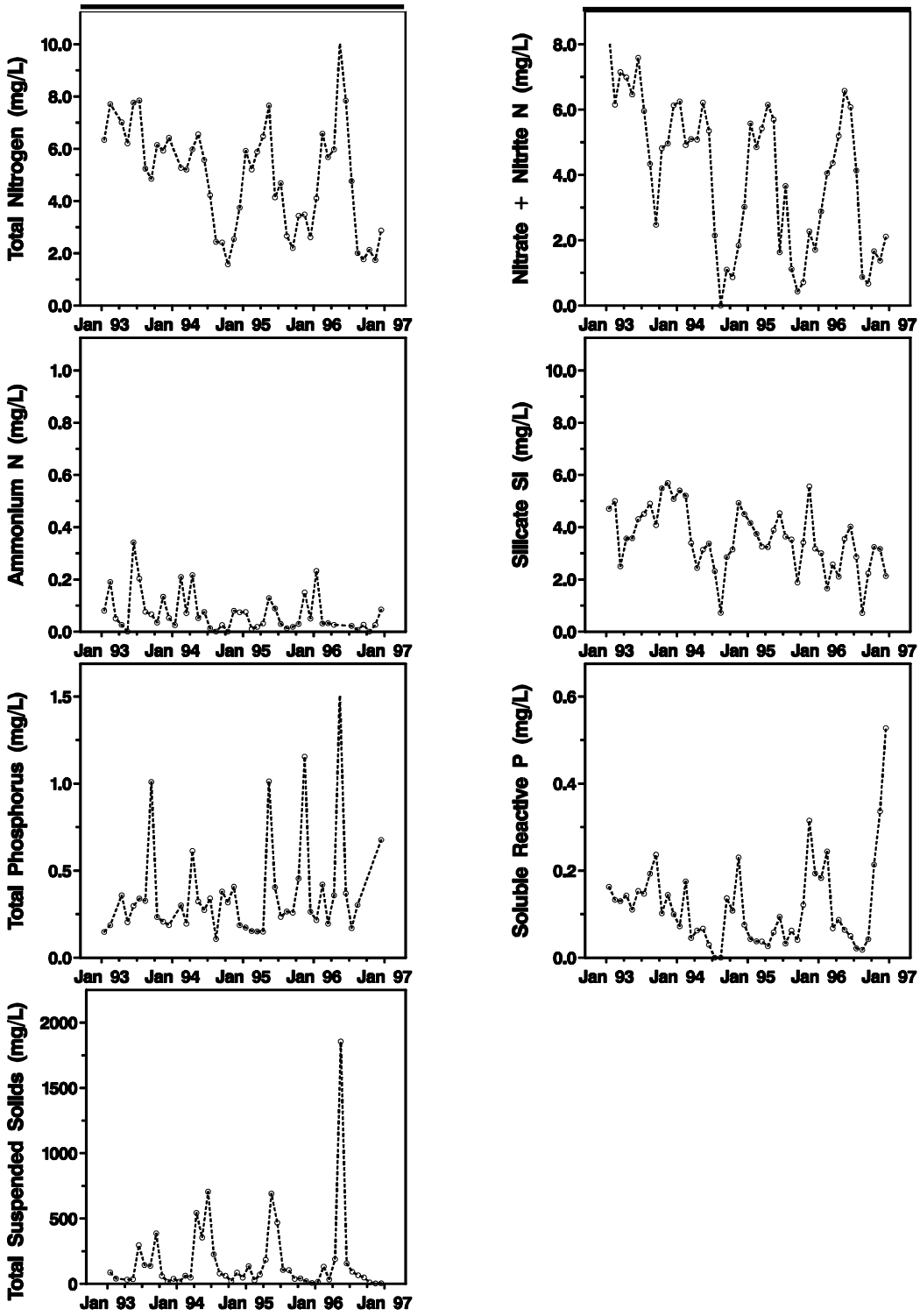


**Figure E-2d.** Monthly means of total nitrogen (mg/L), nitrate–nitrite nitrogen(mg/L), ammonium nitrogen (mg/L), silicate silicon (mg/L), total phosphorus (mg/L), soluble reactive phosphorus (mg/L), and total suspended solids (mg/L) in the Sangamon River from 1993 through 1996.

# Appendix F. Stratified Random Sampling Data: 1993–1996

In Appendix F, we summarize data from stratified random sampling (SRS) in both tabular and graphic forms. The tables contain summary statistics for each SRS episode and stratum divided into two parameter groups: (1) physical and biological measurements (Table F-1), and (2) chemical data (major plant nutrients; Table F-2). Within each parameter group, the data are divided by sampling depth into three groups (surface, middepth, and bottom). Chemical measurements are typically collected only at the surface and near the bottom. The majority of all measurement are in the near-surface category and most episodes do not have chemical data from other depths. Refer to Appendix A for maps and descriptions of the individual sampling strata and episodes.

The figures (F-1–F-13) are box-whisker diagrams that connect the medians for each sampling episode from spring 1993 through fall 1996. The 10th and 90th percentiles for each episode are indicated by the lower and upper limits of the box. Vertical lines extend above and below each box to the minimum and maximum observed value or to the limits of the plotting axis.

Data that have been flagged as questionable in the Long Term Resource Monitoring Program database because of recorder error, instrument malfunction, sample damage, contamination, improper handling, analytical error, or other difficulties are excluded from this summary. Values that are below detection are indicated by the detection limit preceded by a negative sign. Below-detection values are included in the determination of minima, maxima, and medians, but in the calculation of means and standard deviations, values below detection have been replaced by a value equal to half the detection limit. The Secchi transparency data in this report do not include observations where Secchi transparency exceeded the water column depth. High transparency conditions are thus underrepresented.

**Table F-1.** Summaries of physical-biological measurements during each stratified random sampling episode from 1993 through 1996. Data are grouped into three sampling-depth categories: near surface (less than 0.2 m from surface), middepth, and near bottom (0.2 m above the substrate).

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 7.17 | 0.68 | — | — | — | — | 26.7 | 5.75 | 73 | 511 | 8.2 | 35.1 | 31 | 31.4 | 6.2 | 6.49 | 4.06 |
| | Median | 0.2 | 7.3 | 0.72 | — | — | — | — | 26.8 | 5.8 | 72 | 511 | 8.1 | 32 | 31 | 31.3 | 6 | 6.49 | 3.35 |
| | Minimum | 0.2 | 3.1 | 0.35 | — | — | — | — | 26 | 4.3 | 54 | 500 | 7.8 | 29 | 14 | 17.2 | 4.4 | 2.99 | 1.66 |
| | Maximum | 0.2 | 10 | 0.98 | — | — | — | — | 27.6 | 7.4 | 94 | 523 | 8.9 | 68 | 50 | 63.6 | 9.7 | 9.98 | 8.56 |
| | Std. dev. | 0 | 1.58 | 0.32 | — | — | — | — | 0.45 | 0.5 | 6.44 | 6.59 | 0.35 | 7.92 | 7.44 | 10.5 | 1.52 | 4.94 | 2.03 |
| | *N* obs. | 35 | 35 | 3 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 19 | 19 | 2 | 19 |
| 2. Side channel | Mean | 0.2 | 5.12 | 0.26 | — | — | — | — | 26.8 | 5.79 | 73 | 502 | 8.2 | 33.2 | 32 | 28.6 | 6.8 | 4.37 | 3.68 |
| | Median | 0.2 | 4.9 | 0.22 | — | — | — | — | 26.5 | 5.8 | 73 | 503 | 8.1 | 30.5 | 34 | 27.8 | 6.1 | 4.37 | 3.03 |
| | Minimum | 0.2 | 2.1 | 0 | — | — | — | — | 25.8 | 5 | 62 | 489 | 7.8 | 28 | 18 | 15.2 | 3.3 | 4.37 | 0.83 |
| | Maximum | 0.2 | 7.6 | 0.61 | — | — | — | — | 28 | 6.5 | 83 | 515 | 8.9 | 42 | 43 | 53.2 | 16.2 | 4.37 | 8.04 |
| | Std. dev. | 0 | 1.58 | 0.22 | — | — | — | — | 0.6 | 0.39 | 5.62 | 6.31 | 0.35 | 4.56 | 7.77 | 12.4 | 3.59 | — | 1.86 |
| | *N* obs. | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 11 | 11 | 1 | 11 |
| 3. Backwater | Mean | 0.2 | 4.35 | 0.19 | — | — | — | — | 26.9 | 5.86 | 74 | 511 | 8.1 | 42.9 | 23 | 18.9 | 4.6 | 12.9 | 5.2 |
| | Median | 0.2 | 4.3 | 0.15 | — | — | — | — | 26.9 | 5.7 | 73 | 509 | 8 | 40 | 23 | 17.5 | 4.7 | 10.9 | 4.77 |
| | Minimum | 0.2 | 2 | 0.04 | — | — | — | — | 25.8 | 4.7 | 60 | 488 | 7.8 | 23 | 11 | 7.4 | 0.1 | 5.61 | 0 |
| | Maximum | 0.2 | 6.5 | 0.65 | — | — | — | — | 28.8 | 7.6 | 100 | 564 | 8.9 | 82 | 38 | 41.9 | 11.4 | 28.3 | 17.2 |
| | Std. dev. | 0 | 0.67 | 0.13 | — | — | — | — | 0.7 | 0.66 | 8.95 | 15.8 | 0.26 | 13.4 | 6.84 | 8.5 | 1.79 | 9.08 | 3.4 |
| | *N* obs. | 75 | 75 | 75 | 0 | 0 | 0 | 0 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 43 | 43 | 5 | 43 |
| **1993 Middepth measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 2.3 | 4.6 | — | — | — | — | — | 26.5 | 5.1 | 64 | — | — | — | — | — | — | — | — |
| | Median | 2.3 | 4.6 | — | — | — | — | — | 26.5 | 5.1 | 64 | — | — | — | — | — | — | — | — |
| | Minimum | 2.3 | 4.6 | — | — | — | — | — | 26.5 | 5.1 | 64 | — | — | — | — | — | — | — | — |
| | Maximum | 2.3 | 4.6 | — | — | — | — | — | 26.5 | 5.1 | 64 | — | — | — | — | — | — | — | — |
| | Std. dev. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | *N* obs. | 1 | 1 | 0 | — | — | — | — | 1 | 1 | 1 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 |
| **1993 Near-bottom measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 6.2 | 6.4 | 0.5 | — | — | — | — | 26.5 | 6 | 75 | 510 | 7.9 | — | 39 | — | — | — | — |
| | Median | 6.2 | 6.4 | 0.5 | — | — | — | — | 26.5 | 6 | 75 | 510 | 7.9 | — | 39 | — | — | — | — |
| | Minimum | 6.2 | 6.4 | 0.5 | — | — | — | — | 26.5 | 6 | 75 | 510 | 7.9 | — | 39 | — | — | — | — |
| | Maximum | 6.2 | 6.4 | 0.5 | — | — | — | — | 26.5 | 6 | 75 | 510 | 7.9 | — | 39 | — | — | — | — |
| | Std. dev. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | *N* obs. | 1 | 1 | 1 | — | — | — | — | 1 | 1 | 1 | 1 | 1 | — | 1 | 0 | 0 | 0 | 0 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-bottom measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 4.92 | 5.12 | 0.16 | — | — | — | — | 26.4 | 5.16 | 65 | 509 | 8.2 | — | 42 | — | — | — | — |
| | Median | 4.7 | 4.9 | 0.14 | — | — | — | — | 26.3 | 5.5 | 69 | 509 | 8.1 | — | 42 | — | — | — | — |
| | Minimum | 1.9 | 2.1 | 0 | — | — | — | — | 25.2 | 0.4 | 5 | 495 | 7.8 | — | 24 | — | — | — | — |
| | Maximum | 7.4 | 7.6 | 0.48 | — | — | — | — | 27 | 5.9 | 75 | 540 | 8.7 | — | 75 | — | — | — | — |
| | Std. dev. | 1.58 | 1.58 | 0.15 | — | — | — | — | 0.46 | 1.23 | 15.5 | 8.89 | 0.3 | — | 10.9 | — | — | — | — |
| | *N* obs. | 20 | 20 | 20 | — | — | — | — | 20 | 20 | 20 | 20 | 20 | — | 20 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 4.15 | 4.35 | 0.1 | — | — | — | — | 26.3 | 5.19 | 65 | 515 | 8 | — | 34 | — | — | — | — |
| | Median | 4.1 | 4.3 | 0.08 | — | — | — | — | 26.3 | 5.2 | 65 | 510 | 7.9 | — | 33 | — | — | — | — |
| | Minimum | 1.8 | 2 | 0 | — | — | — | — | 25 | 4.1 | 52 | 502 | 7.7 | — | 14 | — | — | — | — |
| | Maximum | 6.3 | 6.5 | 0.34 | — | — | — | — | 27.6 | 6.4 | 82 | 566 | 8.7 | — | 69 | — | — | — | — |
| | Std. dev. | 0.67 | 0.67 | 0.08 | — | — | — | — | 0.55 | 0.46 | 5.91 | 14.1 | 0.2 | — | 10.9 | — | — | — | — |
| | *N* obs. | 75 | 75 | 75 | — | — | — | — | 75 | 75 | 75 | 75 | 75 | — | 75 | 0 | 0 | 0 | 0 |
| **1993 Near-surface measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 5 | — | — | — | — | — | 14 | 8.27 | 80 | 589 | 8.4 | 22.1 | 69 | 80.5 | 13.1 | 10.7 | 10.6 |
| | Median | 0.2 | 5.5 | — | — | — | — | — | 14.6 | 8.2 | 80 | 619 | 8.4 | 20 | 68 | 77.1 | 13.9 | 10.7 | 11.5 |
| | Minimum | 0.2 | 1.2 | — | — | — | — | — | 11.7 | 7.5 | 69 | 467 | 8 | 12 | 33 | 42.4 | 6.9 | 9.8 | 2.52 |
| | Maximum | 0.2 | 7.6 | — | — | — | — | — | 14.9 | 10.4 | 96 | 688 | 8.7 | 35 | 148 | 138 | 18.8 | 11.6 | 20.7 |
| | Std. dev. | 0 | 1.85 | — | — | — | — | — | 1.13 | 0.47 | 4.75 | 77.9 | 0.21 | 5.75 | 23.9 | 24.5 | 3.35 | 1.26 | 6.36 |
| | *N* obs. | 35 | 35 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 19 | 19 | 2 | 19 |
| 2. Side channel | Mean | 0.2 | 3.4 | 0.35 | — | — | — | — | 14.2 | 8.05 | 78 | 601 | 8.3 | 26.6 | 50 | 66.6 | 13.2 | 11.1 | 9.48 |
| | Median | 0.2 | 3.25 | 0.32 | — | — | — | — | 14.5 | 8 | 78 | 627 | 8.3 | 22 | 46 | 62.3 | 12.1 | 11.1 | 9.34 |
| | Minimum | 0.2 | 1.8 | 0.05 | — | — | — | — | 11.8 | 7.3 | 72 | 478 | 8 | 12 | 23 | 29.3 | 5.9 | 11.1 | 6.06 |
| | Maximum | 0.2 | 5.8 | 0.78 | — | — | — | — | 14.7 | 8.8 | 86 | 660 | 8.6 | 48 | 134 | 155 | 29.6 | 11.1 | 15.6 |
| | Std. dev. | 0 | 1.24 | 0.2 | — | — | — | — | 0.85 | 0.34 | 3.13 | 53.7 | 0.17 | 9.19 | 24.4 | 38.4 | 7.41 | — | 3.11 |
| | *N* obs. | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 11 | 11 | 1 | 11 |
| 3. Backwater | Mean | 0.2 | 2.86 | 0.15 | — | — | — | — | 13.6 | 7.79 | 75 | 560 | 8.1 | 42 | 26 | 22.1 | 6.2 | 9.47 | 6.63 |
| | Median | 0.2 | 2.7 | 0.11 | — | — | — | — | 13.7 | 7.8 | 74 | 556 | 8.1 | 41 | 25 | 20 | 5.9 | 8.47 | 6.31 |
| | Minimum | 0.2 | 1.5 | 0 | — | — | — | — | 11.3 | 4.9 | 48 | 420 | 7.6 | 23 | 13 | 7.3 | 4.2 | 5.35 | 0 |
| | Maximum | 0.2 | 5.5 | 0.58 | — | — | — | — | 14.8 | 9.1 | 89 | 675 | 8.7 | 61 | 48 | 44.3 | 11.2 | 15.6 | 20.1 |
| | Std. dev. | 0 | 0.64 | 0.15 | — | — | — | — | 0.89 | 0.72 | 6.63 | 49.2 | 0.19 | 9.76 | 7.4 | 9.24 | 1.37 | 4.7 | 3.64 |
| | *N* obs. | 79 | 79 | 68 | 0 | 0 | 0 | 0 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 42 | 42 | 4 | 42 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-bottom measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 3.2 | 3.4 | 0.24 | — | — | — | — | 14.2 | 7.94 | 77 | 600 | 8.2 | — | 57 | — | — | — | — |
| | Median | 3.05 | 3.25 | 0.25 | — | — | — | — | 14.5 | 8 | 78 | 628 | 8.3 | — | 52 | — | — | — | — |
| | Minimum | 1.6 | 1.8 | 0.07 | — | — | — | — | 11.8 | 7.2 | 71 | 489 | 8 | — | 23 | — | — | — | — |
| | Maximum | 5.6 | 5.8 | 0.42 | — | — | — | — | 14.7 | 8.4 | 83 | 664 | 8.4 | — | 150 | — | — | — | — |
| | Std. dev. | 1.24 | 1.24 | 0.11 | — | — | — | — | 0.85 | 0.31 | 2.73 | 52.9 | 0.12 | — | 28.7 | — | — | — | — |
| | *N* obs. | 20 | 20 | 10 | — | — | — | — | 20 | 20 | 20 | 20 | 20 | — | 20 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 2.66 | 2.86 | 0.07 | — | — | — | — | 13.6 | 7.57 | 73 | 560 | 8.1 | — | 29 | — | — | — | — |
| | Median | 2.5 | 2.7 | 0.05 | — | — | — | — | 13.7 | 7.6 | 72 | 556 | 8 | — | 27 | — | — | — | — |
| | Minimum | 1.3 | 1.5 | 0 | — | — | — | — | 11.3 | 4.4 | 43 | 418 | 7.5 | — | 15 | — | — | — | — |
| | Maximum | 5.3 | 5.5 | 0.25 | — | — | — | — | 14.8 | 8.9 | 86 | 672 | 8.5 | — | 52 | — | — | — | — |
| | Std. dev. | 0.64 | 0.64 | 0.07 | — | — | — | — | 0.87 | 0.82 | 7.54 | 50.8 | 0.16 | — | 8.03 | — | — | — | — |
| | *N* obs. | 79 | 79 | 68 | — | — | — | — | 79 | 79 | 79 | 79 | 79 | — | 79 | 0 | 0 | 0 | 0 |
| **1994 Near-surface measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 4.16 | — | 10 | 20 | — | — | 1.12 | 12.3 | 87 | 850 | 8.1 | 29.2 | 50 | 70 | 9.3 | 6.07 | 4.03 |
| | Median | 0.2 | 4.9 | — | 10 | 20 | — | — | 1.2 | 12.2 | 86 | 852 | 7.8 | 29 | 43 | 61.1 | 9 | 6.12 | 4.04 |
| | Minimum | 0.2 | 0.6 | — | 10 | 20 | — | — | 0.5 | 11 | 78 | 728 | 7.7 | 18 | 26 | 28.4 | 4.5 | 5.24 | 2.69 |
| | Maximum | 0.2 | 6.4 | — | 10 | 20 | — | — | 1.9 | 15.5 | 108 | 994 | 9.4 | 41 | 84 | 134 | 14.6 | 6.86 | 6.21 |
| | Std. dev. | 0 | 1.9 | — | — | — | — | — | 0.34 | 1.09 | 7.19 | 66.1 | 0.54 | 6.39 | 18.7 | 31.7 | 2.82 | 0.81 | 0.94 |
| | *N* obs. | 19 | 19 | 0 | 1 | 1 | 0 | 0 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 3 | 19 |
| 2. Side channel | Mean | 0.19 | 2.67 | 0.29 | 30 | 9 | — | — | 1.07 | 11.8 | 83 | 762 | 8.4 | 33 | 45 | 57.6 | 8 | 6.64 | 5.46 |
| | Median | 0.2 | 2.1 | 0.27 | 30 | 10 | — | — | 1.2 | 12 | 84 | 765 | 8.3 | 30 | 44 | 54.7 | 7.9 | 6.64 | 5.69 |
| | Minimum | 0.1 | 0.9 | 0 | 10 | 5 | — | — | 0.3 | 10.1 | 71 | 530 | 7.3 | 18 | 14 | 12.4 | 2.7 | 6.42 | 0.98 |
| | Maximum | 0.2 | 5.5 | 0.55 | 80 | 12 | — | — | 2 | 12.9 | 91 | 972 | 9.3 | 60 | 130 | 180 | 17.9 | 6.86 | 9.82 |
| | Std. dev. | 0.03 | 1.56 | 0.13 | 21.8 | 2.42 | — | — | 0.44 | 0.65 | 4.64 | 91.5 | 0.61 | 10.9 | 24.5 | 36.7 | 3.55 | 0.31 | 2 |
| | *N* obs. | 20 | 20 | 20 | 9 | 9 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 2 | 20 |
| 3. Backwater | Mean | 0.2 | 1.1 | 0.04 | 100 | 22 | 90 | 3 | 1.33 | 13.2 | 94 | 629 | 8.2 | 57.5 | 16 | 14.3 | 4.4 | 17.5 | 11.7 |
| | Median | 0.2 | 0.9 | 0 | 100 | 21 | 100 | 2 | 1 | 13.2 | 92 | 640 | 8.1 | 52 | 14 | 11.5 | 4.3 | 16.9 | 10.2 |
| | Minimum | 0.2 | 0.4 | 0 | 100 | 5 | 30 | 1 | 0 | 7.4 | 54 | 368 | 7 | 20 | 5 | 3 | 1.4 | 5.16 | 0 |
| | Maximum | 0.2 | 6.4 | 0.56 | 100 | 38 | 100 | 5 | 5 | 19.8 | 143 | 838 | 9.2 | 136 | 55 | 74.3 | 10.8 | 27.4 | 56 |
| | Std. dev. | 0 | 0.87 | 0.1 | 0 | 7.35 | 22.5 | 1.3 | 0.92 | 2.72 | 19.6 | 122 | 0.31 | 24 | 9.9 | 11.4 | 1.65 | 8.15 | 10.2 |
| | *N* obs. | 59 | 59 | 59 | 56 | 56 | 44 | 44 | 59 | 59 | 59 | 59 | 59 | 46 | 59 | 59 | 59 | 5 | 59 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-bottom measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 2.47 | 2.67 | 0.23 | — | — | — | — | 1.04 | 12 | 84 | 787 | 8.4 | — | 46 | — | — | — | — |
| | Median | 1.9 | 2.1 | 0.2 | — | — | — | — | 1.2 | 11.9 | 84 | 775 | 8.2 | — | 49 | — | — | — | — |
| | Minimum | 0.7 | 0.9 | 0.12 | — | — | — | — | 0 | 10.3 | 72 | 693 | 7.4 | — | 11 | — | — | — | — |
| | Maximum | 5.3 | 5.5 | 0.45 | — | — | — | — | 2 | 13.6 | 93 | 960 | 9.6 | — | 68 | — | — | — | — |
| | Std. dev. | 1.56 | 1.56 | 0.1 | — | — | — | — | 0.52 | 0.79 | 5.18 | 70 | 0.67 | — | 15.2 | — | — | — | — |
| | *N* obs. | 20 | 20 | 15 | — | — | — | — | 20 | 20 | 20 | 14 | 14 | — | 14 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.02 | 1.22 | 0.03 | — | — | — | — | 1.58 | 14.3 | 103 | 662 | 8.2 | — | 17 | — | — | — | — |
| | Median | 0.7 | 0.9 | 0.01 | — | — | — | — | 1.45 | 13.2 | 92 | 662 | 8.1 | — | 15 | — | — | — | — |
| | Minimum | 0.4 | 0.6 | 0 | — | — | — | — | 0.2 | 8.4 | 61 | 433 | 7.3 | — | 6 | — | — | — | — |
| | Maximum | 6.2 | 6.4 | 0.48 | — | — | — | — | 3.2 | 21 | 156 | 835 | 8.9 | — | 87 | — | — | — | — |
| | Std. dev. | 0.93 | 0.93 | 0.09 | — | — | — | — | 0.87 | 3.63 | 27.4 | 100 | 0.23 | — | 13.4 | — | — | — | — |
| | *N* obs. | 47 | 47 | 46 | — | — | — | — | 46 | 46 | 46 | 47 | 47 | — | 47 | 0 | 0 | 0 | 0 |
| **1994 Near-surface measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 5.91 | 0.52 | — | — | — | — | 17.6 | 9.5 | 99 | 604 | 8.2 | 26.5 | 50 | 61.2 | 11.1 | 14.9 | 35.5 |
| | Median | 0.2 | 6.4 | 0.52 | — | — | — | — | 17.7 | 9.8 | 103 | 578 | 8.2 | 21 | 45 | 53.1 | 10.3 | 15.7 | 37.7 |
| | Minimum | 0.2 | 2.1 | 0.41 | — | — | — | — | 16.1 | 7.5 | 81 | 471 | 7.9 | 10 | 16 | 22.8 | 6.6 | 10.5 | 3.37 |
| | Maximum | 0.2 | 10.1 | 0.64 | — | — | — | — | 19.2 | 11.6 | 118 | 727 | 8.5 | 58 | 91 | 195 | 22 | 17.5 | 67 |
| | Std. dev. | 0 | 1.88 | 0.12 | — | — | — | — | 1.07 | 1.34 | 12.3 | 86.3 | 0.14 | 11.7 | 23.7 | 38.5 | 3.43 | 3.34 | 16.2 |
| | *N* obs. | 35 | 35 | 3 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 4 | 35 |
| 2. Side channel | Mean | 0.2 | 4.1 | 0.34 | — | — | — | — | 17.9 | 9.43 | 100 | 587 | 8.2 | 28 | 51 | 61 | 11.1 | 25 | 36.3 |
| | Median | 0.2 | 4 | 0.32 | — | — | — | — | 18 | 8.9 | 96 | 574 | 8.3 | 29.5 | 42 | 49.7 | 10 | 18.7 | 36.1 |
| | Minimum | 0.2 | 2.1 | 0.12 | — | — | — | — | 16.2 | 7.9 | 84 | 446 | 7.7 | 15 | 23 | 22.1 | 7.2 | 3.74 | 6.99 |
| | Maximum | 0.2 | 6.4 | 0.63 | — | — | — | — | 19.2 | 11.4 | 124 | 716 | 8.4 | 39 | 110 | 149 | 17.6 | 46.5 | 61.8 |
| | Std. dev. | 0 | 1.27 | 0.14 | — | — | — | — | 0.99 | 1.2 | 12.6 | 72.9 | 0.22 | 7.57 | 24.5 | 33.2 | 3.38 | 17.1 | 15.5 |
| | *N* obs. | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 5 | 20 |
| 3. Backwater | Mean | 0.2 | 2.83 | 0.13 | — | — | — | — | 18 | 10.6 | 113 | 573 | 8.2 | 31.5 | 38 | 35.9 | 9.8 | 45.2 | 53.2 |
| | Median | 0.2 | 2.8 | 0.09 | — | — | — | — | 18.8 | 10.7 | 109 | 592 | 8.2 | 30 | 33 | 36.9 | 9.8 | 53.9 | 50.4 |
| | Minimum | 0.2 | 1.5 | 0 | — | — | — | — | 14.9 | 7.2 | 79 | 446 | 7.5 | 15 | 13 | 13 | 5.4 | 5.61 | 5.94 |
| | Maximum | 0.2 | 4.3 | 0.43 | — | — | — | — | 20 | 15.6 | 169 | 617 | 8.7 | 60 | 80 | 66.9 | 17.2 | 67.4 | 146 |
| | Std. dev. | 0 | 0.48 | 0.09 | — | — | — | — | 1.5 | 1.9 | 20.6 | 47.5 | 0.37 | 11.6 | 17.4 | 13.9 | 2.32 | 27.7 | 29.7 |
| | *N* obs. | 77 | 77 | 75 | 0 | 0 | 0 | 0 | 77 | 77 | 77 | 77 | 77 | 76 | 77 | 77 | 77 | 4 | 77 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-bottom measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 5 | 5.2 | — | — | — | — | — | 17.5 | 7.9 | 83 | 465 | 7.8 | — | 73 | — | — | — | — |
| | Median | 5 | 5.2 | — | — | — | — | — | 17.5 | 7.9 | 83 | 465 | 7.8 | — | 73 | — | — | — | — |
| | Minimum | 5 | 5.2 | — | — | — | — | — | 17.5 | 7.9 | 83 | 465 | 7.8 | — | 73 | — | — | — | — |
| | Maximum | 5 | 5.2 | — | — | — | — | — | 17.5 | 7.9 | 83 | 465 | 7.8 | — | 73 | — | — | — | — |
| | Std. dev. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | *N* obs. | 1 | 1 | 0 | — | — | — | — | 1 | 1 | 1 | 1 | 1 | — | 1 | 0 | 0 | 0 | 0 |
| 2. Side channel | Mean | 3.9 | 4.1 | 0.22 | — | — | — | — | 17.8 | 9.15 | 96 | 585 | 8.2 | — | 70 | — | — | — | — |
| | Median | 3.8 | 4 | 0.19 | — | — | — | — | 17.9 | 8.75 | 93 | 568 | 8.3 | — | 57 | — | — | — | — |
| | Minimum | 1.9 | 2.1 | 0.15 | — | — | — | — | 16.1 | 7.9 | 83 | 445 | 7.7 | — | 33 | — | — | — | — |
| | Maximum | 6.2 | 6.4 | 0.33 | — | — | — | — | 19 | 10.9 | 111 | 723 | 8.4 | — | 160 | — | — | — | — |
| | Std. dev. | 1.27 | 1.27 | 0.07 | — | — | — | — | 0.98 | 1.08 | 10.6 | 76.1 | 0.24 | — | 36 | — | — | — | — |
| | *N* obs. | 20 | 20 | 6 | — | — | — | — | 20 | 20 | 20 | 20 | 20 | — | 20 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 2.63 | 2.83 | 0.09 | — | — | — | — | 17.7 | 10.2 | 107 | 576 | 8.2 | — | 46 | — | — | — | — |
| | Median | 2.6 | 2.8 | 0.07 | — | — | — | — | 18.1 | 10.1 | 102 | 596 | 8.3 | — | 42 | — | — | — | — |
| | Minimum | 1.3 | 1.5 | 0 | — | — | — | — | 14.2 | 6.6 | 72 | 450 | 7.4 | — | 16 | — | — | — | — |
| | Maximum | 4.1 | 4.3 | 0.3 | — | — | — | — | 19.7 | 15.6 | 169 | 633 | 8.9 | — | 88 | — | — | — | — |
| | Std. dev. | 0.48 | 0.48 | 0.07 | — | — | — | — | 1.57 | 1.8 | 20.2 | 47.5 | 0.4 | — | 16.6 | — | — | — | — |
| | *N* obs. | 77 | 77 | 73 | — | — | — | — | 77 | 77 | 77 | 77 | 77 | — | 77 | 0 | 0 | 0 | 0 |
| **1994 Near-surface measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 3.58 | — | — | — | — | — | 27.6 | 6.5 | 84 | 626 | 8.1 | 22.9 | 61 | 74.5 | 12.7 | — | 39 |
| | Median | 0.2 | 4 | — | — | — | — | — | 27.9 | 6.6 | 85 | 623 | 8.2 | 22 | 62 | 75.6 | 12.7 | — | 36.7 |
| | Minimum | 0.2 | 0.8 | — | — | — | — | — | 26 | 5.3 | 67 | 608 | 7.7 | 15 | 24 | 18.8 | 6.6 | — | 22.5 |
| | Maximum | 0.2 | 5.5 | — | — | — | — | — | 28.4 | 7.4 | 97 | 662 | 8.4 | 30 | 92 | 125 | 18.5 | — | 67.4 |
| | Std. dev. | 0 | 1.43 | — | — | — | — | — | 0.59 | 0.51 | 7.13 | 11.8 | 0.22 | 3.58 | 16.9 | 23 | 2.9 | — | 9.82 |
| | *N* obs. | 35 | 35 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 0 | 35 |
| 2. Side channel | Mean | 0.2 | 1.83 | 0.25 | — | — | — | — | 27.2 | 6.96 | 89 | 626 | 7.9 | 21.7 | 70 | 89.9 | 16 | 34.8 | 52.8 |
| | Median | 0.2 | 1.55 | 0.24 | — | — | — | — | 27.2 | 6.3 | 80 | 639 | 7.8 | 21 | 70 | 76.5 | 15.2 | 32.9 | 46 |
| | Minimum | 0.2 | 0.35 | 0.02 | — | — | — | — | 24.2 | 5.4 | 69 | 492 | 7.6 | 17 | 35 | 50.1 | 10.5 | 31.8 | 33.8 |
| | Maximum | 0.2 | 4.5 | 0.51 | — | — | — | — | 28.3 | 13.3 | 160 | 667 | 8.4 | 28 | 140 | 169 | 33.8 | 39.7 | 136 |
| | Std. dev. | 0 | 1.18 | 0.12 | — | — | — | — | 0.85 | 2.16 | 26.5 | 40.5 | 0.24 | 3.13 | 23.6 | 33.5 | 4.8 | 4.25 | 26.7 |
| | *N* obs. | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 3 | 20 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 0.2 | 0.67 | 0.03 | — | — | — | — | 27.3 | 10.5 | 135 | 568 | 8.4 | 14.7 | 161 | 126 | 26.3 | 88 | 107 |
| | Median | 0.2 | 0.44 | 0.02 | — | — | — | — | 27 | 9.6 | 121 | 606 | 8.4 | 14 | 150 | 114 | 24.6 | 86.1 | 107 |
| | Minimum | 0.2 | 0.16 | 0 | — | — | — | — | 24.9 | 5.5 | 68 | 372 | 7.9 | 5 | 30 | 31.5 | 7.4 | 32.7 | 10.7 |
| | Maximum | 0.2 | 2.15 | 0.23 | — | — | — | — | 32.2 | 18.6 | 259 | 716 | 8.9 | 32 | 540 | 374 | 64.6 | 157 | 300 |
| | Std. dev. | 0 | 0.5 | 0.04 | — | — | — | — | 1.5 | 3.13 | 43.1 | 95.5 | 0.25 | 6.4 | 104 | 69.7 | 12.1 | 37.9 | 54.1 |
| | *N* obs. | 65 | 65 | 65 | 0 | 0 | 0 | 0 | 65 | 65 | 65 | 65 | 63 | 64 | 65 | 64 | 64 | 9 | 61 |
| **1994 Middepth measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 0.65 | 1.4 | — | — | — | — | — | 26.6 | 9.19 | 117 | 495 | 8.4 | — | 85 | — | — | — | — |
| | Median | 0.6 | 1.28 | — | — | — | — | — | 26.9 | 7.1 | 90 | 509 | 8.4 | — | 75 | — | — | — | — |
| | Minimum | 0.4 | 0.85 | — | — | — | — | — | 25.3 | 1.8 | 22 | 395 | 8.1 | — | 36 | — | — | — | — |
| | Maximum | 1 | 2.1 | — | — | — | — | — | 28 | 18 | 233 | 612 | 8.7 | — | 160 | — | — | — | — |
| | Std. dev. | 0.21 | 0.44 | — | — | — | — | — | 1.11 | 5.52 | 72.2 | 84.8 | 0.25 | — | 51.1 | — | — | — | — |
| | *N* obs. | 8 | 8 | 0 | — | — | — | — | 8 | 8 | 8 | 6 | 6 | — | 6 | 0 | 0 | 0 | 0 |
| **1994 Near-bottom measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 1.93 | 2.15 | 0.17 | — | — | — | — | 26.9 | 6.56 | 83 | 621 | 7.9 | — | 97 | — | — | — | — |
| | Median | 1.75 | 1.98 | 0.18 | — | — | — | — | 27 | 5.85 | 74 | 630 | 7.8 | — | 92 | — | — | — | — |
| | Minimum | 0.5 | 0.7 | 0.06 | — | — | — | — | 24.2 | 5.4 | 69 | 458 | 7.7 | — | 53 | — | — | — | — |
| | Maximum | 4.3 | 4.5 | 0.33 | — | — | — | — | 28.2 | 13.3 | 160 | 659 | 8.3 | — | 190 | — | — | — | — |
| | Std. dev. | 1.1 | 1.09 | 0.07 | — | — | — | — | 0.85 | 2.09 | 24.3 | 48.2 | 0.22 | — | 37.9 | — | — | — | — |
| | *N* obs. | 16 | 16 | 16 | — | — | — | — | 16 | 16 | 16 | 16 | 16 | — | 15 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.08 | 1.31 | 0.03 | — | — | — | — | 25.6 | 7.17 | 89 | 502 | 8.3 | — | 112 | — | — | — | — |
| | Median | 0.95 | 1.17 | 0.01 | — | — | — | — | 25.7 | 7.6 | 92 | 529 | 8.3 | — | 93 | — | — | — | — |
| | Minimum | 0.6 | 0.85 | 0 | — | — | — | — | 23.5 | 1.5 | 18 | 376 | 7.8 | — | 33 | — | — | — | — |
| | Maximum | 1.9 | 2.15 | 0.22 | — | — | — | — | 28.1 | 12.4 | 159 | 626 | 8.7 | — | 240 | — | — | — | — |
| | Std. dev. | 0.39 | 0.4 | 0.05 | — | — | — | — | 1.23 | 3.03 | 38.7 | 98.4 | 0.24 | — | 53.1 | — | — | — | — |
| | *N* obs. | 20 | 20 | 20 | — | — | — | — | 20 | 20 | 20 | 20 | 20 | — | 20 | 0 | 0 | 0 | 0 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 3.03 | 0.1 | — | — | — | — | 17.1 | 8.92 | 93 | 711 | 8.1 | 20.5 | 64 | 74.8 | 14.2 | 45.2 | 36.3 |
| | Median | 0.2 | 3.35 | 0.1 | — | — | — | — | 17.1 | 8.9 | 93 | 704 | 8.1 | 20 | 61 | 71.3 | 14.1 | 42.7 | 40.4 |
| | Minimum | 0.2 | 0.3 | 0.1 | — | — | — | — | 15.2 | 8 | 84 | 692 | 7.9 | 14 | 42 | 38.2 | 9 | 32.9 | 5.05 |
| | Maximum | 0.2 | 6.1 | 0.1 | — | — | — | — | 19.9 | 9.8 | 103 | 756 | 8.3 | 26 | 135 | 140 | 21.3 | 63.6 | 55.3 |
| | Std. dev. | 0 | 1.65 | — | — | — | — | — | 1.08 | 0.55 | 5.26 | 18.1 | 0.1 | 3.44 | 17.3 | 23.6 | 3.24 | 12 | 12.4 |
| | *N* obs. | 35 | 35 | 1 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 5 | 35 |
| 2. Side channel | Mean | 0.2 | 1.6 | 0.16 | — | — | — | — | 16.4 | 8.96 | 92 | 712 | 8.1 | 19.6 | 73 | 80.7 | 15.2 | 62.4 | 50.3 |
| | Median | 0.2 | 1.4 | 0.18 | — | — | — | — | 16.3 | 8.4 | 85 | 693 | 8 | 19.5 | 72 | 81.3 | 15.1 | 62.4 | 37.4 |
| | Minimum | 0.2 | 0.3 | 0 | — | — | — | — | 15.3 | 7.6 | 78 | 672 | 7.9 | 15 | 35 | 50.4 | 10.5 | 53.3 | 4.56 |
| | Maximum | 0.2 | 3.35 | 0.44 | — | — | — | — | 18.3 | 14.8 | 158 | 876 | 8.7 | 26 | 118 | 124 | 18.9 | 71.5 | 164 |
| | Std. dev. | 0 | 0.97 | 0.11 | — | — | — | — | 0.88 | 1.8 | 20.2 | 59.9 | 0.22 | 2.73 | 20 | 17.7 | 2.36 | 12.9 | 40.7 |
| | *N* obs. | 18 | 18 | 17 | 0 | 0 | 0 | 0 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 2 | 18 |
| 3. Backwater | Mean | 0.2 | 0.76 | 0.02 | — | — | — | — | 16.4 | 10.9 | 111 | 546 | 8.6 | 16.1 | 99 | 110 | 23.6 | 152 | 71.1 |
| | Median | 0.2 | 0.6 | 0.02 | — | — | — | — | 15.8 | 10.3 | 111 | 598 | 8.6 | 17 | 75 | 83.6 | 20.2 | 152 | 73.8 |
| | Minimum | 0.2 | 0.2 | 0 | — | — | — | — | 12.3 | 4.3 | 43 | 357 | 7.9 | 5 | 39 | 37.2 | 7.3 | 121 | 0.92 |
| | Maximum | 0.2 | 2 | 0.06 | — | — | — | — | 20.3 | 14.8 | 154 | 846 | 9.1 | 31 | 480 | 519 | 71 | 182 | 130 |
| | Std. dev. | 0 | 0.48 | 0.02 | — | — | — | — | 2.07 | 2.82 | 28.8 | 159 | 0.42 | 5.54 | 82.8 | 95.5 | 12.4 | 43.7 | 32 |
| | *N* obs. | 36 | 36 | 35 | 0 | 0 | 0 | 0 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 2 | 36 |
| **1994 Near-bottom measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 2.8 | 3.05 | 0.04 | — | — | — | — | 17.7 | 8.3 | 87 | 760 | 8.1 | — | 56 | — | — | — | — |
| | Median | 2.8 | 3.05 | 0.04 | — | — | — | — | 17.7 | 8.3 | 87 | 760 | 8.1 | — | 56 | — | — | — | — |
| | Minimum | 2.8 | 3.05 | 0.04 | — | — | — | — | 17.7 | 8.3 | 87 | 760 | 8.1 | — | 56 | — | — | — | — |
| | Maximum | 2.8 | 3.05 | 0.04 | — | — | — | — | 17.7 | 8.3 | 87 | 760 | 8.1 | — | 56 | — | — | — | — |
| | Std. dev. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | *N* obs. | 1 | 1 | 1 | — | — | — | — | 1 | 1 | 1 | 1 | 1 | — | 1 | 0 | 0 | 0 | 0 |
| 2. Side channel | Mean | 1.95 | 2.19 | 0.12 | — | — | — | — | 16 | 8.19 | 83 | 694 | 8 | — | 100 | — | — | — | — |
| | Median | 1.9 | 2.15 | 0.12 | — | — | — | — | 15.7 | 8.1 | 83 | 693 | 8 | — | 90 | — | — | — | — |
| | Minimum | 1 | 1.2 | 0 | — | — | — | — | 15 | 7.4 | 75 | 669 | 7.9 | — | 77 | — | — | — | — |
| | Maximum | 3.1 | 3.35 | 0.26 | — | — | — | — | 17.8 | 9.6 | 99 | 728 | 8.2 | — | 170 | — | — | — | — |
| | Std. dev. | 0.74 | 0.76 | 0.07 | — | — | — | — | 0.73 | 0.57 | 6.33 | 13.7 | 0.09 | — | 26.2 | — | — | — | — |
| | *N* obs. | 11 | 11 | 9 | — | — | — | — | 11 | 11 | 11 | 11 | 11 | — | 11 | 0 | 0 | 0 | 0 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-bottom measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 1.2 | 1.41 | 0 | — | — | — | — | 16.3 | 10.4 | 105 | 475 | 8.7 | — | 87 | — | — | — | — |
| | Median | 1.15 | 1.38 | 0 | — | — | — | — | 15.7 | 11.4 | 112 | 364 | 8.9 | — | 69 | — | — | — | — |
| | Minimum | 0.9 | 1.1 | 0 | — | — | — | — | 13.7 | 6.3 | 65 | 359 | 8.1 | — | 61 | — | — | — | — |
| | Maximum | 1.8 | 2 | 0 | — | — | — | — | 18.7 | 13.9 | 140 | 676 | 9.1 | — | 170 | — | — | — | — |
| | Std. dev. | 0.32 | 0.32 | 0 | — | — | — | — | 1.68 | 3.1 | 29.3 | 148 | 0.36 | — | 35.1 | — | — | — | — |
| | *N* obs. | 10 | 10 | 7 | — | — | — | — | 10 | 10 | 10 | 10 | 10 | — | 10 | 0 | 0 | 0 | 0 |
| **1995 Near-surface measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 4.29 | — | — | — | — | — | 0.89 | 11.5 | 80 | 813 | 7.9 | 28.6 | 46 | 51.4 | 9 | 5.39 | 4.73 |
| | Median | 0.2 | 4.75 | — | — | — | — | — | 0.85 | 12.9 | 88 | 829 | 7.9 | 29 | 36 | 38 | 8.3 | 4.49 | 3.09 |
| | Minimum | 0.2 | 0.65 | — | — | — | — | — | 0.2 | 5 | 34 | 712 | 7.8 | 11 | 23 | 24.9 | 3.5 | 1.25 | 0 |
| | Maximum | 0.2 | 8.55 | — | — | — | — | — | 2.1 | 14.6 | 103 | 884 | 8.3 | 42 | 132 | 204 | 25.7 | 11.2 | 18.7 |
| | Std. dev. | 0 | 2.1 | — | — | — | — | — | 0.54 | 3.26 | 23.1 | 51.6 | 0.11 | 7.14 | 22.3 | 36 | 4.48 | 4.03 | 3.95 |
| | *N* obs. | 30 | 30 | 0 | 0 | 0 | 0 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 5 | 29 |
| 2. Side channel | Mean | 0.2 | 3.82 | 0.34 | 80 | 6 | — | — | 1.01 | 13 | 91 | 722 | 7.8 | 34.7 | 32 | 27.1 | 5.8 | 1.37 | 2.74 |
| | Median | 0.2 | 2.9 | 0.32 | 80 | 6 | — | — | 0.9 | 13.5 | 95 | 713 | 7.8 | 35.5 | 32 | 26.3 | 6.1 | 1.37 | 2.72 |
| | Minimum | 0.2 | 0.95 | 0 | 60 | 4 | — | — | 0.2 | 5.1 | 35 | 658 | 7.7 | 26 | 24 | 15.5 | 1.9 | -1 | 0.63 |
| | Maximum | 0.2 | 7.3 | 0.7 | 100 | 7 | — | — | 3.6 | 15 | 105 | 888 | 8 | 44 | 46 | 55.2 | 8.5 | 3.74 | 5.46 |
| | Std. dev. | 0 | 1.94 | 0.2 | 28.3 | 2.12 | — | — | 0.68 | 2.56 | 18.1 | 56.5 | 0.09 | 4.09 | 4.68 | 9.72 | 1.59 | 3.35 | 1.22 |
| | *N* obs. | 20 | 20 | 19 | 2 | 2 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 2 | 20 |
| 3. Backwater | Mean | 0.2 | 2.11 | 0.04 | 98.3 | 12 | 69 | 2 | 1.81 | 13.2 | 95 | 648 | 7.8 | 50 | 21 | 13.6 | 4.2 | 3.96 | 16.9 |
| | Median | 0.2 | 2.15 | 0.02 | 100 | 8 | 60 | 2 | 1.4 | 13 | 93 | 663 | 7.8 | 48 | 22 | 13 | 4 | 4.99 | 6.03 |
| | Minimum | 0.2 | 0.8 | 0 | 50 | 2 | 30 | 1 | 1 | 9.2 | 65 | 507 | 7.5 | 20 | 9 | 0.5 | 1 | 2.08 | 0 |
| | Maximum | 0.2 | 4.3 | 0.21 | 100 | 24 | 100 | 4 | 4.3 | 18.2 | 136 | 734 | 8.6 | 77 | 55 | 65.1 | 11.6 | 5.15 | 139 |
| | Std. dev. | 0 | 0.59 | 0.06 | 9.13 | 8.32 | 25.7 | .72 | 0.8 | 1.63 | 12.9 | 45.8 | 0.28 | 10.2 | 6.17 | 7.07 | 1.64 | 1.54 | 25.2 |
| | *N* obs. | 72 | 72 | 67 | 30 | 30 | 17 | 17 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 5 | 72 |
| **1995 Near-bottom measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 3.75 | 3.97 | 0.23 | — | — | — | — | 1.04 | 13.3 | 94 | 716 | 7.8 | — | 31 | — | — | — | — |
| | Median | 2.8 | 3.05 | 0.25 | — | — | — | — | 0.9 | 13.4 | 95 | 712 | 7.8 | — | 31 | — | — | — | — |
| | Minimum | 1.1 | 1.35 | 0 | — | — | — | — | 0.2 | 7.6 | 52 | 658 | 7.7 | — | 24 | — | — | — | — |
| | Maximum | 7.1 | 7.3 | 0.4 | — | — | — | — | 3.6 | 14.6 | 102 | 890 | 8 | — | 42 | — | — | — | — |
| | Std. dev. | 1.88 | 1.87 | 0.12 | — | — | — | — | 0.69 | 1.69 | 11.7 | 46.3 | 0.06 | — | 4.29 | — | — | — | — |
| | *N* obs. | 19 | 19 | 18 | — | — | — | — | 19 | 19 | 19 | 19 | 18 | — | 19 | 0 | 0 | 0 | 0 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-bottom measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 1.94 | 2.15 | 0.03 | — | — | — | — | 1.86 | 13.1 | 95 | 652 | 7.8 | — | 20 | — | — | — | — |
| | Median | 1.9 | 2.15 | 0.02 | — | — | — | — | 1.4 | 13 | 92 | 666 | 7.7 | — | 20 | — | — | — | — |
| | Minimum | 0.8 | 1 | 0 | — | — | — | — | 1 | 10.2 | 75 | 559 | 7.6 | — | 6 | — | — | — | — |
| | Maximum | 4.1 | 4.3 | 0.14 | — | — | — | — | 3.6 | 17.7 | 133 | 739 | 8.6 | — | 57 | — | — | — | — |
| | Std. dev. | 0.56 | 0.56 | 0.04 | — | — | — | — | 0.84 | 1.32 | 11.2 | 41.7 | 0.29 | — | 7.79 | — | — | — | — |
| | *N* obs. | 70 | 70 | 66 | — | — | — | — | 70 | 70 | 70 | 70 | 66 | — | 69 | 0 | 0 | 0 | 0 |
| **1995 Near-surface measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 6 | — | — | — | — | — | 12.6 | 10.4 | 98 | 695 | 7.9 | 42.7 | 29 | 34 | 6 | 20.1 | 18.4 |
| | Median | 0.2 | 6.4 | — | — | — | — | — | 12.5 | 10.5 | 99 | 690 | 8 | 45 | 28 | 33.3 | 5.9 | 19.2 | 20.9 |
| | Minimum | 0.2 | 1.2 | — | — | — | — | — | 12.3 | 9.5 | 89 | 661 | 7.8 | 30 | 19 | -0.1 | 4.8 | 10.6 | 0 |
| | Maximum | 0.2 | 9.5 | — | — | — | — | — | 13.1 | 11.6 | 109 | 723 | 8.1 | 55 | 43 | 67.5 | 8.1 | 31.3 | 32.2 |
| | Std. dev. | 0 | 2.46 | — | — | — | — | — | 0.21 | 0.75 | 6.67 | 21 | 0.1 | 7.36 | 6.02 | 10.6 | 0.75 | 10.3 | 9.94 |
| | *N* obs. | 35 | 34 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 4 | 35 |
| 2. Side channel | Mean | 0.2 | 3.98 | 0.39 | — | — | — | — | 12.8 | 10.1 | 95 | 671 | 7.9 | 38.3 | 33 | 35.6 | 6.6 | 18.1 | 12.8 |
| | Median | 0.2 | 3.85 | 0.42 | — | — | — | — | 12.7 | 10.1 | 96 | 672 | 7.9 | 40 | 31 | 32.5 | 6.8 | 18.1 | 11.2 |
| | Minimum | 0.2 | 2 | 0.01 | — | — | — | — | 12.2 | 9.5 | 89 | 627 | 7.6 | 31 | 19 | 22.2 | 4.2 | 13.7 | 7.75 |
| | Maximum | 0.2 | 6.7 | 0.69 | — | — | — | — | 13.6 | 10.6 | 101 | 711 | 8.1 | 45 | 44 | 59.3 | 8.7 | 22.5 | 23.8 |
| | Std. dev. | 0 | 1.41 | 0.16 | — | — | — | — | 0.39 | 0.38 | 3.76 | 20.2 | 0.12 | 3.78 | 6.71 | 11.3 | 1.33 | 6.17 | 4.83 |
| | *N* obs. | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 2 | 20 |
| 3. Backwater | Mean | 0.2 | 2.64 | 0.16 | — | — | — | — | 12.8 | 11.4 | 107 | 673 | 8.1 | 44.5 | 22 | 21.7 | 5.9 | 28.7 | 30.2 |
| | Median | 0.2 | 2.5 | 0.1 | — | — | — | — | 12.8 | 11.3 | 107 | 685 | 8.1 | 45 | 21 | 20.8 | 5.8 | 29.5 | 29.5 |
| | Minimum | 0.2 | 1.4 | 0 | — | — | — | — | 12.1 | 9.3 | 88 | 600 | 7.7 | 30 | 8 | 9.8 | 3.6 | 10.8 | 7.44 |
| | Maximum | 0.2 | 4.8 | 0.78 | — | — | — | — | 13.4 | 13.4 | 127 | 714 | 8.4 | 70 | 37 | 52.2 | 8.7 | 39.9 | 53.1 |
| | Std. dev. | 0 | 0.61 | 0.15 | — | — | — | — | 0.31 | 0.77 | 7.5 | 30 | 0.11 | 8.51 | 6.04 | 7.31 | 0.93 | 9.81 | 7.27 |
| | *N* obs. | 80 | 80 | 80 | 0 | 0 | 0 | 0 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 7 | 79 |
| **1995 Near-bottom measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 3.66 | 3.87 | 0.26 | — | — | — | — | 12.8 | 10 | 95 | 673 | 8 | — | 34 | — | — | — | — |
| | Median | 3.5 | 3.7 | 0.31 | — | — | — | — | 12.7 | 10.1 | 96 | 671 | 8 | — | 32 | — | — | — | — |
| | Minimum | 1.8 | 2 | 0 | — | — | — | — | 12.2 | 9.4 | 88 | 632 | 7.7 | — | 26 | — | — | — | — |
| | Maximum | 6.5 | 6.7 | 0.49 | — | — | — | — | 13.2 | 10.5 | 100 | 712 | 8.1 | — | 47 | — | — | — | — |
| | Std. dev. | 1.37 | 1.37 | 0.14 | — | — | — | — | 0.35 | 0.37 | 3.48 | 18.4 | 0.1 | — | 6.55 | — | — | — | — |
| | *N* obs. | 19 | 19 | 19 | — | — | — | — | 19 | 19 | 19 | 19 | 19 | — | 19 | 0 | 0 | 0 | 0 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-bottom measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 2.41 | 2.63 | 0.1 | — | — | — | — | 12.6 | 11 | 103 | 675 | 8 | — | 26 | — | — | — | — |
| | Median | 2.3 | 2.5 | 0.05 | — | — | — | — | 12.7 | 11.1 | 104 | 686 | 8 | — | 28 | — | — | — | — |
| | Minimum | 1.2 | 1.4 | 0 | — | — | — | — | 11.7 | 9.2 | 87 | 612 | 7.7 | — | 8 | — | — | — | — |
| | Maximum | 4.6 | 4.8 | 0.58 | — | — | — | — | 13.4 | 13.4 | 127 | 715 | 8.4 | — | 47 | — | — | — | — |
| | Std. dev. | 0.6 | 0.6 | 0.11 | — | — | — | — | 0.39 | 0.68 | 6.7 | 28.7 | 0.1 | — | 8.12 | — | — | — | — |
| | *N* obs. | 79 | 79 | 79 | — | — | — | — | 79 | 79 | 79 | 79 | 79 | — | 79 | 0 | 0 | 0 | 0 |
| **1995 Near-surface measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 3.48 | — | — | — | — | — | 28.4 | 6.16 | 80 | 687 | 8 | 20.3 | 67 | 73 | 11.3 | 21.7 | 30.8 |
| | Median | 0.2 | 4 | — | — | — | — | — | 28.3 | 5.9 | 78 | 689 | 8 | 19 | 64 | 61.6 | 10.3 | 21.5 | 28 |
| | Minimum | 0.2 | 0.4 | — | — | — | — | — | 27.5 | 5.3 | 68 | 628 | 7.8 | 14 | 40 | 30.5 | 6.1 | 19.7 | 20 |
| | Maximum | 0.2 | 5.5 | — | — | — | — | — | 30.2 | 8.3 | 108 | 734 | 8.5 | 29 | 138 | 199 | 21.1 | 24 | 60.3 |
| | Std. dev. | 0 | 1.69 | — | — | — | — | — | 0.73 | 0.78 | 10.3 | 19.6 | 0.16 | 4.12 | 21.5 | 36.7 | 3.38 | 2.16 | 9.98 |
| | *N* obs. | 35 | 28 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 3 | 35 |
| 2. Side channel | Mean | 0.2 | 1.73 | 0 | — | — | — | — | 28 | 5.22 | 68 | 671 | 8 | 17.4 | 99 | 96.3 | 13.9 | 29.9 | 30.7 |
| | Median | 0.2 | 1.38 | 0 | — | — | — | — | 27.8 | 5 | 65 | 676 | 7.9 | 17.5 | 94 | 81.3 | 11.8 | 29.9 | 28.5 |
| | Minimum | 0.2 | 0.3 | 0 | — | — | — | — | 27.2 | 4.3 | 55 | 583 | 7.8 | 11 | 58 | 42.5 | 8.4 | 29.9 | 21.8 |
| | Maximum | 0.2 | 4 | 0 | — | — | — | — | 30.7 | 7.4 | 97 | 718 | 8.7 | 25 | 158 | 170 | 21.3 | 29.9 | 48.5 |
| | Std. dev. | 0 | 1.16 | — | — | — | — | — | 0.81 | 0.73 | 9.89 | 26 | 0.26 | 3.9 | 30 | 37 | 4.18 | — | 7.04 |
| | *N* obs. | 20 | 20 | 1 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 19 | 1 | 19 |
| 3. Backwater | Mean | 0.2 | 0.75 | 0 | — | — | — | — | 30.1 | 9.21 | 125 | 553 | 8.4 | 16.2 | 137 | 148 | 27 | 110 | 108 |
| | Median | 0.2 | 0.53 | 0 | — | — | — | — | 30 | 9.1 | 126 | 589 | 8.4 | 12 | 110 | 99.4 | 22.3 | 137 | 118 |
| | Minimum | 0.2 | 0.2 | 0 | — | — | — | — | 25.2 | 4.1 | 55 | 381 | 7.9 | 1 | 25 | 17.7 | 3.8 | 26.2 | 12.3 |
| | Maximum | 0.2 | 3 | 0 | — | — | — | — | 33.8 | 14.1 | 187 | 724 | 9 | 41 | 400 | 511 | 66.6 | 165 | 222 |
| | Std. dev. | 0 | 0.62 | 0 | — | — | — | — | 1.99 | 2.12 | 28.6 | 83.4 | 0.23 | 9.89 | 105 | 131 | 16.9 | 55.5 | 50.8 |
| | *N* obs. | 78 | 78 | 2 | 0 | 0 | 0 | 0 | 78 | 76 | 76 | 78 | 78 | 78 | 78 | 77 | 77 | 8 | 77 |
| **1995 Middepth measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 0.91 | 1.91 | — | — | — | — | — | 29.5 | 6.94 | 92 | 525 | 8 | — | — | — | — | — | — |
| | Median | 0.9 | 1.8 | — | — | — | — | — | 30.7 | 8.4 | 107 | 580 | 7.9 | — | — | — | — | — | — |
| | Minimum | 0.3 | 0.75 | — | — | — | — | — | 26.9 | 2.5 | 34 | 412 | 7.8 | — | — | — | — | — | — |
| | Maximum | 1.5 | 3 | — | — | — | — | — | 31.8 | 12.1 | 157 | 607 | 8.5 | — | — | — | — | — | — |
| | Std. dev. | 0.38 | 0.71 | — | — | — | — | — | 2.05 | 3.56 | 47 | 100 | 0.29 | — | — | — | — | — | — |
| | *N* obs. | 7 | 7 | 0 | — | — | — | — | 7 | 7 | 7 | 5 | 5 | — | 0 | 0 | 0 | 0 | 0 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-bottom measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 2.13 | 2.34 | — | — | — | — | — | 27.4 | 4.87 | 62 | 675 | 7.9 | — | 144 | — | — | — | — |
| | Median | 2.4 | 2.6 | — | — | — | — | — | 27.2 | 4.5 | 57 | 676 | 7.8 | — | 154 | — | — | — | — |
| | Minimum | 0.6 | 0.75 | — | — | — | — | — | 27 | 4.2 | 54 | 660 | 7.8 | — | 97 | — | — | — | — |
| | Maximum | 3.8 | 4 | — | — | — | — | — | 28.2 | 7.5 | 96 | 689 | 8.4 | — | 170 | — | — | — | — |
| | Std. dev. | 0.96 | 0.97 | — | — | — | — | — | 0.41 | 0.87 | 11.2 | 8.54 | 0.18 | — | 28.6 | — | — | — | — |
| | *N* obs. | 13 | 13 | 0 | — | — | — | — | 13 | 13 | 13 | 11 | 11 | — | 10 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.24 | 1.46 | — | — | — | — | — | 27.5 | 5.99 | 76 | 485 | 8.2 | — | 73 | — | — | — | — |
| | Median | 1 | 1.2 | — | — | — | — | — | 27.1 | 5.4 | 71 | 417 | 8.2 | — | 72 | — | — | — | — |
| | Minimum | 0.5 | 0.7 | — | — | — | — | — | 24.9 | 0.6 | 8 | 301 | 7.7 | — | 31 | — | — | — | — |
| | Maximum | 2.8 | 3 | — | — | — | — | — | 30.2 | 11.1 | 141 | 772 | 8.6 | — | 136 | — | — | — | — |
| | Std. dev. | 0.65 | 0.65 | — | — | — | — | — | 1.7 | 2.87 | 36.2 | 114 | 0.26 | — | 29.4 | — | — | — | — |
| | *N* obs. | 23 | 23 | 0 | — | — | — | — | 23 | 23 | 23 | 22 | 22 | — | 19 | 0 | 0 | 0 | 0 |
| **1995 Near-surface measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 3.15 | — | — | — | — | — | 17 | 8.74 | 91 | 743 | 7.7 | 20 | 73 | 75.2 | 11.4 | 30.3 | 31.1 |
| | Median | 0.2 | 3.65 | — | — | — | — | — | 16.6 | 8.8 | 90 | 745 | 7.7 | 20 | 67 | 65.1 | 10.8 | 29.9 | 32.2 |
| | Minimum | 0.2 | 0.4 | — | — | — | — | — | 15.9 | 8 | 82 | 716 | 7.4 | 10 | 34 | 21.1 | 6.3 | 20.6 | 2.74 |
| | Maximum | 0.2 | 5.8 | — | — | — | — | — | 20.4 | 9.8 | 106 | 762 | 7.9 | 26 | 138 | 212 | 17.7 | 38.7 | 42.8 |
| | Std. dev. | 0 | 1.41 | — | — | — | — | — | 0.99 | 0.52 | 6.19 | 14.4 | 0.1 | 3.25 | 22.1 | 35.2 | 2.26 | 7.35 | 8.42 |
| | *N* obs. | 35 | 35 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 35 | 5 | 35 |
| 2. Side channel | Mean | 0.2 | 1.53 | 0.11 | — | — | — | — | 16.8 | 8.34 | 86 | 721 | 7.6 | 18.8 | 79 | 90.8 | 14.3 | 21.8 | 28.8 |
| | Median | 0.2 | 1.45 | 0.09 | — | — | — | — | 16.8 | 8.2 | 86 | 745 | 7.6 | 19 | 70 | 70.5 | 12.4 | 21.8 | 30.1 |
| | Minimum | 0.2 | 0.35 | 0 | — | — | — | — | 15.6 | 7.8 | 80 | 513 | 7.5 | 7 | 58 | 53.6 | 8.4 | 21.2 | 2.83 |
| | Maximum | 0.2 | 3.35 | 0.26 | — | — | — | — | 19.6 | 9.5 | 99 | 756 | 7.8 | 22 | 200 | 266 | 33 | 22.5 | 38.8 |
| | Std. dev. | 0 | 0.88 | 0.08 | — | — | — | — | 0.95 | 0.44 | 5.41 | 55 | 0.09 | 3.3 | 32.1 | 51.9 | 6.79 | 0.88 | 9.13 |
| | *N* obs. | 19 | 19 | 19 | 0 | 0 | 0 | 0 | 19 | 19 | 19 | 19 | 19 | 18 | 18 | 19 | 19 | 2 | 19 |
| 3. Backwater | Mean | 0.2 | 1.15 | 0.01 | — | — | — | — | 16.7 | 10.6 | 109 | 538 | 8.1 | 21.3 | 71 | 69.2 | 16.5 | 30.7 | 76.4 |
| | Median | 0.2 | 1.15 | 0 | — | — | — | — | 16 | 10.9 | 110 | 536 | 8.1 | 22 | 51 | 53.9 | 12.7 | 30.7 | 62.4 |
| | Minimum | 0.2 | 0.2 | 0 | — | — | — | — | 14.4 | 6.3 | 66 | 334 | 7.5 | 9 | 29 | 19.9 | 8.9 | 12.8 | 0 |
| | Maximum | 0.2 | 2.6 | 0.06 | — | — | — | — | 21.6 | 15.6 | 156 | 709 | 8.6 | 31 | 250 | 311 | 43.7 | 48.7 | 229 |
| | Std. dev. | 0 | 0.64 | 0.02 | — | — | — | — | 2.02 | 2.22 | 21.5 | 136 | 0.27 | 5.49 | 50.7 | 57 | 8.09 | 25.3 | 46.9 |
| | *N* obs. | 43 | 43 | 42 | 0 | 0 | 0 | 0 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 2 | 43 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Middepth measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 0.8 | 1.9 | 0 | — | — | — | — | 14.8 | 10.3 | 102 | 403 | 8.1 | — | — | — | — | — | — |
| | Median | 0.8 | 1.9 | 0 | — | — | — | — | 14.8 | 10.3 | 102 | 403 | 8.1 | — | — | — | — | — | — |
| | Minimum | 0.8 | 1.9 | 0 | — | — | — | — | 14.8 | 10.3 | 102 | 403 | 8.1 | — | — | — | — | — | — |
| | Maximum | 0.8 | 1.9 | 0 | — | — | — | — | 14.8 | 10.3 | 102 | 403 | 8.1 | — | — | — | — | — | — |
| | Std. dev. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | *N* obs. | 1 | 1 | 1 | — | — | — | — | 1 | 1 | 1 | 1 | 1 | — | 0 | 0 | 0 | 0 | 0 |
| **1995 Near-bottom measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 1.75 | 1.98 | 0.09 | — | — | — | — | 16.6 | 8.06 | 83 | 728 | 7.6 | — | 99 | — | — | — | — |
| | Median | 1.7 | 1.9 | 0.08 | — | — | — | — | 16.6 | 7.9 | 82 | 741 | 7.6 | — | 95 | — | — | — | — |
| | Minimum | 0.8 | 1.05 | 0.01 | — | — | — | — | 15.6 | 7.6 | 77 | 681 | 7.6 | — | 73 | — | — | — | — |
| | Maximum | 3.1 | 3.35 | 0.2 | — | — | — | — | 17.5 | 8.7 | 89 | 756 | 7.8 | — | 140 | — | — | — | — |
| | Std. dev. | 0.68 | 0.68 | 0.05 | — | — | — | — | 0.63 | 0.35 | 4.05 | 26 | 0.06 | — | 22.3 | — | — | — | — |
| | *N* obs. | 13 | 13 | 13 | — | — | — | — | 13 | 13 | 13 | 13 | 13 | — | 11 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.37 | 1.58 | 0 | — | — | — | — | 15.1 | 8.88 | 88 | 491 | 8 | — | 57 | — | — | — | — |
| | Median | 1.3 | 1.5 | 0 | — | — | — | — | 14.4 | 9.2 | 90 | 405 | 8 | — | 50 | — | — | — | — |
| | Minimum | 0.9 | 1.1 | 0 | — | — | — | — | 14.1 | 4.3 | 44 | 402 | 7.8 | — | 39 | — | — | — | — |
| | Maximum | 2.2 | 2.45 | 0.02 | — | — | — | — | 19.4 | 14.1 | 139 | 696 | 8.5 | — | 99 | — | — | — | — |
| | Std. dev. | 0.37 | 0.38 | 0.01 | — | — | — | — | 1.44 | 2.05 | 19.2 | 134 | 0.17 | — | 18.2 | — | — | — | — |
| | *N* obs. | 23 | 23 | 22 | — | — | — | — | 23 | 23 | 23 | 23 | 23 | — | 22 | 0 | 0 | 0 | 0 |
| **1996 Near-surface measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 3.42 | — | 95 | 10 | 100 | — | 1.36 | 14.2 | 101 | 1016 | 7.7 | 27.8 | 47 | 51.1 | 6.8 | 2.36 | 3.44 |
| | Median | 0.2 | 4.25 | — | 95 | 10 | 100 | — | 1.5 | 14.1 | 101 | 1030 | 7.7 | 28 | 47 | 53 | 6.7 | 2.36 | 3.44 |
| | Minimum | 0.2 | 0.4 | — | 95 | 10 | 100 | — | 0 | 13.1 | 90 | 918 | 7.6 | 19 | 25 | 15.3 | 4 | 2.14 | 0 |
| | Maximum | 0.2 | 5.8 | — | 95 | 10 | 100 | — | 2.2 | 15.3 | 109 | 1078 | 7.7 | 35 | 70 | 83.1 | 9.9 | 2.57 | 7.69 |
| | Std. dev. | 0 | 1.89 | — | — | — | — | — | 0.63 | 0.63 | 5.5 | 44.4 | 0.05 | 4.57 | 12.1 | 17.6 | 1.53 | 0.3 | 1.68 |
| | *N* obs. | 23 | 23 | 0 | 1 | 1 | 1 | 0 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 2 | 23 |
| 2. Side channel | Mean | 0.2 | 2.08 | 0 | 100 | 17 | 90 | 1 | 0.12 | 13 | 89 | 1087 | 7.5 | 39.4 | 31 | 28 | 4.9 | 2.63 | 3.25 |
| | Median | 0.2 | 2 | 0 | 100 | 18 | 90 | 1 | 0.1 | 12.8 | 88 | 1109 | 7.5 | 40 | 31 | 27.2 | 4.9 | 2.57 | 3.08 |
| | Minimum | 0.2 | 0.7 | 0 | 100 | 7 | 80 | 1 | 0 | 12.4 | 85 | 810 | 7.4 | 30 | 15 | 11.9 | 2.9 | 1.9 | 0 |
| | Maximum | 0.2 | 3.6 | 0 | 100 | 23 | 100 | 2 | 0.6 | 15.7 | 109 | 1150 | 7.6 | 60 | 40 | 40.6 | 6.3 | 3.42 | 7.62 |
| | Std. dev. | 0 | 0.99 | — | 0 | 5.09 | 11 | .41 | 0.13 | 0.77 | 5.62 | 81.7 | 0.05 | 7.05 | 5.68 | 6.54 | 0.77 | 0.76 | 2.44 |
| | *N* obs. | 17 | 16 | 1 | 16 | 16 | 6 | 6 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 3 | 17 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 0.2 | 0.97 | 0 | 100 | 23 | 96 | 2 | 1.34 | 17.6 | 125 | 632 | 7.7 | 65.8 | 10 | 7.2 | 2.8 | 8.08 | 7.23 |
| | Median | 0.2 | 0.8 | 0 | 100 | 25 | 100 | 1 | 1.3 | 16.2 | 114 | 547 | 7.6 | 65 | 8 | 6.3 | 2.5 | 7.78 | 1.89 |
| | Minimum | 0.1 | 0.35 | 0 | 100 | 1 | 80 | 1 | 0 | 13.1 | 90 | 362 | 7.3 | 39 | 2 | -0.1 | 1.2 | 1.07 | 0 |
| | Maximum | 0.2 | 2.1 | 0 | 100 | 31 | 100 | 5 | 2.8 | 24.5 | 177 | 1102 | 8.7 | 82 | 23 | 24.4 | 10.2 | 15.4 | 45.5 |
| | Std. dev. | 0.02 | 0.43 | 0 | 0 | 6.05 | 7.88 | 1.1 | 0.9 | 3.74 | 29 | 251 | 0.33 | 13.7 | 6.66 | 5.43 | 1.61 | 7.17 | 10.4 |
| | *N* obs. | 41 | 41 | 37 | 39 | 39 | 21 | 21 | 41 | 38 | 38 | 41 | 41 | 18 | 41 | 41 | 41 | 3 | 41 |
| **1996 Near-bottom measurements: winter** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 2.18 | 2.38 | 0 | — | — | — | — | 0.15 | 13 | 89 | 1103 | 7.5 | — | 33 | — | — | — | — |
| | Median | 2.1 | 2.3 | 0 | — | — | — | — | 0.1 | 12.7 | 87 | 1118 | 7.5 | — | 33 | — | — | — | — |
| | Minimum | 0.9 | 1.1 | 0 | — | — | — | — | 0.1 | 12.5 | 86 | 919 | 7.4 | — | 17 | — | — | — | — |
| | Maximum | 3.4 | 3.6 | 0 | — | — | — | — | 0.5 | 15.3 | 106 | 1150 | 7.5 | — | 44 | — | — | — | — |
| | Std. dev. | 0.85 | 0.85 | — | — | — | — | — | 0.11 | 0.75 | 5.43 | 61.9 | 0.04 | — | 6.73 | — | — | — | — |
| | *N* obs. | 13 | 13 | 1 | — | — | — | — | 13 | 13 | 13 | 13 | 13 | — | 13 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.19 | 1.4 | 0 | — | — | — | — | 2.03 | 19 | 138 | 540 | 7.7 | — | 6 | — | — | — | — |
| | Median | 1 | 1.2 | 0 | — | — | — | — | 1.4 | 19.4 | 137 | 543 | 7.5 | — | 6 | — | — | — | — |
| | Minimum | 0.6 | 0.8 | 0 | — | — | — | — | 0.2 | 14.2 | 98 | 367 | 7.3 | — | 3 | — | — | — | — |
| | Maximum | 1.9 | 2.1 | 0 | — | — | — | — | 3.6 | 23.8 | 178 | 1161 | 8.1 | — | 15 | — | — | — | — |
| | Std. dev. | 0.43 | 0.43 | 0 | — | — | — | — | 1.06 | 3.12 | 26.2 | 194 | 0.28 | — | 3.82 | — | — | — | — |
| | *N* obs. | 15 | 15 | 14 | — | — | — | — | 15 | 15 | 15 | 15 | 15 | — | 14 | 0 | 0 | 0 | 0 |
| **1996 Near-surface measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 4.16 | — | — | — | — | — | 14.2 | 9.49 | 92 | 872 | 7.8 | 17.5 | 108 | 166 | 19.2 | 13.7 | 21 |
| | Median | 0.2 | 4.6 | — | — | — | — | — | 14.5 | 9.3 | 91 | 888 | 7.8 | 17 | 103 | 162 | 19 | 13.5 | 21.5 |
| | Minimum | 0.2 | 0.65 | — | — | — | — | — | 12.1 | 8.2 | 80 | 774 | 7 | 11 | 59 | 51.5 | 10.7 | 10.7 | 1.72 |
| | Maximum | 0.2 | 6.7 | — | — | — | — | — | 15.4 | 12.1 | 116 | 930 | 8.5 | 23 | 240 | 463 | 35.3 | 17.1 | 35.4 |
| | Std. dev. | 0 | 1.75 | — | — | — | — | — | 0.87 | 0.91 | 8.51 | 45.5 | 0.27 | 2.42 | 40.4 | 89.2 | 5.35 | 3.27 | 5.3 |
| | *N* obs. | 35 | 35 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 4 | 35 |
| 2. Side channel | Mean | 0.2 | 2.37 | 0.37 | — | — | — | — | 14.6 | 9.95 | 98 | 887 | 7.8 | 18.9 | 95 | 140 | 17.9 | 12.5 | 21.9 |
| | Median | 0.2 | 2.25 | 0.4 | — | — | — | — | 14.5 | 10 | 98 | 891 | 7.8 | 19 | 92 | 141 | 17.8 | 12 | 21.6 |
| | Minimum | 0.2 | 0.45 | 0 | — | — | — | — | 14.3 | 8.6 | 85 | 733 | 7.4 | 16 | 63 | 77.7 | 11.6 | 9.98 | 17.1 |
| | Maximum | 0.2 | 3.9 | 0.52 | — | — | — | — | 15.3 | 11.7 | 115 | 915 | 8.2 | 23 | 162 | 199 | 24.7 | 15.7 | 28.6 |
| | Std. dev. | 0 | 1.02 | 0.15 | — | — | — | — | 0.25 | 0.92 | 8.74 | 38.5 | 0.18 | 1.92 | 26.5 | 37.8 | 3.51 | 2.89 | 3.37 |
| | *N* obs. | 20 | 20 | 13 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 3 | 19 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 0.2 | 1.19 | 0.04 | — | — | — | — | 13.4 | 10.1 | 97 | 661 | 7.8 | 18.8 | 95 | 99.2 | 16.3 | 34 | 40.5 |
| | Median | 0.2 | 0.95 | 0.03 | — | — | — | — | 13.9 | 9.8 | 94 | 698 | 7.8 | 18 | 87 | 79.2 | 13.9 | 24.1 | 30 |
| | Minimum | 0.2 | 0.4 | 0 | — | — | — | — | 10.2 | 7.7 | 75 | 367 | 7.3 | 9 | 27 | 22.9 | 6 | 17.1 | 7.85 |
| | Maximum | 0.2 | 4.25 | 0.24 | — | — | — | — | 16.1 | 15.6 | 151 | 901 | 8.6 | 40 | 222 | 291 | 41.4 | 87.7 | 151 |
| | Std. dev. | 0 | 0.67 | 0.04 | — | — | — | — | 1.62 | 1.39 | 13.1 | 169 | 0.25 | 6.48 | 54.4 | 66.1 | 7.92 | 27.4 | 30.3 |
| | *N* obs. | 79 | 79 | 48 | 0 | 0 | 0 | 0 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 6 | 79 |
| **1996 Near-bottom measurements: spring** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 2.41 | 2.61 | 0.28 | — | — | — | — | 14.6 | 9.92 | 98 | 897 | 7.9 | — | 99 | — | — | — | — |
| | Median | 2.3 | 2.5 | 0.27 | — | — | — | — | 14.6 | 10 | 98 | 896 | 7.9 | — | 99 | — | — | — | — |
| | Minimum | 0.9 | 1.1 | 0.17 | — | — | — | — | 14.4 | 8.6 | 85 | 875 | 7.6 | — | 78 | — | — | — | — |
| | Maximum | 3.7 | 3.9 | 0.36 | — | — | — | — | 15 | 11.4 | 112 | 913 | 8.4 | — | 120 | — | — | — | — |
| | Std. dev. | 0.84 | 0.85 | 0.06 | — | — | — | — | 0.16 | 0.93 | 8.93 | 11.2 | 0.22 | — | 17.2 | — | — | — | — |
| | *N* obs. | 17 | 17 | 12 | — | — | — | — | 17 | 17 | 17 | 17 | 17 | — | 7 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.51 | 1.73 | 0.04 | — | — | — | — | 14 | 9.25 | 90 | 581 | 7.7 | — | 83 | — | — | — | — |
| | Median | 1.3 | 1.55 | 0.02 | — | — | — | — | 14 | 9.2 | 89 | 570 | 7.8 | — | 65 | — | — | — | — |
| | Minimum | 0.8 | 1.05 | 0 | — | — | — | — | 12.3 | 8.3 | 79 | 368 | 7.3 | — | 29 | — | — | — | — |
| | Maximum | 4 | 4.25 | 0.13 | — | — | — | — | 16.1 | 11 | 105 | 901 | 8 | — | 231 | — | — | — | — |
| | Std. dev. | 0.78 | 0.78 | 0.04 | — | — | — | — | 1.14 | 0.63 | 7.06 | 164 | 0.23 | — | 49.8 | — | — | — | — |
| | *N* obs. | 31 | 31 | 17 | — | — | — | — | 30 | 30 | 30 | 30 | 30 | — | 31 | 0 | 0 | 0 | 0 |
| **1996 Near-surface measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 5.64 | — | — | — | — | — | 23.9 | 5.82 | 70 | 472 | 7.6 | 18.8 | 246 | 303 | 28 | 10.2 | 12.3 |
| | Median | 0.2 | 6.1 | — | — | — | — | — | 24.4 | 6.3 | 76 | 494 | 7.6 | 21 | 63 | 88.8 | 12.8 | 9.59 | 10.3 |
| | Minimum | 0.2 | 2.15 | — | — | — | — | — | 22.6 | 4.6 | 54 | 414 | 7.2 | 4 | 41 | 34.8 | 5.9 | 4.39 | 5.06 |
| | Maximum | 0.2 | 9.15 | — | — | — | — | — | 24.8 | 7.1 | 86 | 514 | 8 | 37 | 750 | 912 | 82.6 | 18.3 | 21.4 |
| | Std. dev. | 0 | 2.06 | — | — | — | — | — | 0.86 | 0.77 | 10.2 | 35.8 | 0.17 | 12.6 | 235 | 316 | 24 | 5.39 | 4.51 |
| | *N* obs. | 35 | 35 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 6 | 35 |
| 2. Side channel | Mean | 0.2 | 3.46 | — | — | — | — | — | 23.5 | 5.66 | 67 | 469 | 7.5 | 13 | 335 | 424 | 38.9 | 14.4 | 20.8 |
| | Median | 0.2 | 3.2 | — | — | — | — | — | 23 | 5.05 | 59 | 456 | 7.4 | 8 | 413 | 573 | 49.1 | 14.4 | 16.6 |
| | Minimum | 0.2 | 1.25 | — | — | — | — | — | 22.8 | 4.9 | 57 | 448 | 7.4 | 5 | 33 | 36.1 | 7 | 14.4 | 6.74 |
| | Maximum | 0.2 | 7 | — | — | — | — | — | 25.4 | 9.4 | 116 | 567 | 8.1 | 32 | 640 | 684 | 67.4 | 14.4 | 68.6 |
| | Std. dev. | 0 | 1.46 | — | — | — | — | — | 0.92 | 1.31 | 17.1 | 35.6 | 0.19 | 8.65 | 207 | 263 | 21.6 | — | 16.4 |
| | *N* obs. | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 1 | 19 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 0.2 | 1.74 | 0.22 | — | — | — | — | 25.2 | 7.37 | 91 | 537 | 7.8 | 20.7 | 84 | 59.7 | 12.4 | 33 | 31.5 |
| | Median | 0.2 | 1.55 | 0 | — | — | — | — | 25.2 | 6.45 | 79 | 542 | 7.7 | 18 | 81 | 54.3 | 12.1 | 36.1 | 22.6 |
| | Minimum | 0.2 | 1.2 | 0 | — | — | — | — | 22.9 | 4.4 | 51 | 411 | 7.3 | 6 | 22 | 14.1 | 5.9 | 7.16 | 6.9 |
| | Maximum | 0.2 | 3.65 | 2 | — | — | — | — | 27.2 | 13.6 | 173 | 688 | 8.5 | 55 | 260 | 183 | 23.2 | 48.4 | 115 |
| | Std. dev. | 0 | 0.56 | 0.65 | — | — | — | — | 0.94 | 2.26 | 29.3 | 81.6 | 0.32 | 10 | 50.1 | 32.2 | 3.78 | 14.5 | 23.5 |
| | *N* obs. | 80 | 80 | 18 | 0 | 0 | 0 | 0 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 6 | 80 |
| **1996 Middepth measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 3. Backwater | Mean | 1.42 | 2.89 | — | — | — | — | — | 24.6 | 6.12 | 74 | 522 | 7.7 | — | 40 | — | — | — | — |
| | Median | 1.5 | 3.05 | — | — | — | — | — | 24.6 | 5.75 | 70 | 494 | 7.7 | — | 38 | — | — | — | — |
| | Minimum | 0.9 | 1.8 | — | — | — | — | — | 24.2 | 5.2 | 62 | 474 | 7.5 | — | 24 | — | — | — | — |
| | Maximum | 1.8 | 3.65 | — | — | — | — | — | 25 | 7.8 | 94 | 604 | 7.9 | — | 58 | — | — | — | — |
| | Std. dev. | 0.35 | 0.67 | — | — | — | — | — | 0.32 | 0.97 | 11.7 | 61 | 0.13 | — | 14.7 | — | — | — | — |
| | *N* obs. | 6 | 6 | 0 | — | — | — | — | 6 | 6 | 6 | 6 | 6 | — | 6 | 0 | 0 | 0 | 0 |
| **1996 Near-bottom measurements: summer** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 2.97 | 3.19 | — | — | — | — | — | 23.5 | 5.52 | 66 | 473 | 7.5 | — | 341 | — | — | — | — |
| | Median | 2.8 | 3.05 | — | — | — | — | — | 23 | 5 | 58 | 458 | 7.4 | — | 430 | — | — | — | — |
| | Minimum | 1 | 1.25 | — | — | — | — | — | 22.8 | 4.8 | 56 | 448 | 7.4 | — | 55 | — | — | — | — |
| | Maximum | 6.8 | 7 | — | — | — | — | — | 24.7 | 7.3 | 89 | 568 | 8 | — | 650 | — | — | — | — |
| | Std. dev. | 1.53 | 1.52 | — | — | — | — | — | 0.84 | 0.91 | 12 | 39.3 | 0.19 | — | 236 | — | — | — | — |
| | *N* obs. | 16 | 16 | 0 | — | — | — | — | 16 | 16 | 16 | 16 | 16 | — | 16 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.55 | 1.76 | — | — | — | — | — | 24.4 | 5.75 | 69 | 529 | 7.6 | — | 101 | — | — | — | — |
| | Median | 1.3 | 1.55 | — | — | — | — | — | 24.5 | 5.6 | 68 | 504 | 7.6 | — | 89 | — | — | — | — |
| | Minimum | 1 | 1.2 | — | — | — | — | — | 22.8 | 2.5 | 30 | 412 | 7.3 | — | 35 | — | — | — | — |
| | Maximum | 3.4 | 3.65 | — | — | — | — | — | 26 | 9.8 | 121 | 706 | 8.3 | — | 266 | — | — | — | — |
| | Std. dev. | 0.56 | 0.57 | — | — | — | — | — | 0.77 | 1.45 | 18.4 | 83.8 | 0.23 | — | 49.6 | — | — | — | — |
| | *N* obs. | 76 | 76 | 0 | — | — | — | — | 76 | 76 | 76 | 76 | 76 | — | 76 | 0 | 0 | 0 | 0 |

**Table F-1.** Continued.

| Sampling stratum | Statistic | Sample depth (m) | Water depth (m) | Water velocity (m/s) | Ice cover (%) | Thickness of ice (cm) | Snow cover (%) | Snow depth (cm) | Water temp. (°C) | Dissolved oxygen (mg/L) | Oxygen saturation (%) | Specific cond. (µS) | pH | Secchi depth (cm) | Turbidity (NTU) | Total suspended solids (mg/L) | Volatile suspended solids (mg/L) | Spectr. chl. (µg/L) | Fluor. chl. (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 1. Main channel | Mean | 0.2 | 3 | — | — | — | — | — | 16.6 | 8.68 | 89 | 724 | 8.1 | 24.3 | 52 | 53.7 | 10.3 | 38.7 | 41.8 |
| | Median | 0.2 | 3.6 | — | — | — | — | — | 16.6 | 9.1 | 94 | 720 | 8.1 | 24 | 48 | 50.5 | 10 | 33.2 | 37.7 |
| | Minimum | 0.2 | 0.35 | — | — | — | — | — | 14.9 | 4.9 | 49 | 680 | 7.7 | 17 | 29 | 26.7 | 6.9 | 22.9 | 14.8 |
| | Maximum | 0.2 | 7 | — | — | — | — | — | 21.7 | 10.9 | 124 | 764 | 8.4 | 31 | 85 | 102 | 13.4 | 69.2 | 86.2 |
| | Std. dev. | 0 | 1.96 | — | — | — | — | — | 1.29 | 1.37 | 15.8 | 28.8 | 0.13 | 3.71 | 13.7 | 18.6 | 1.65 | 16.1 | 18.6 |
| | *N* obs. | 35 | 22 | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 6 | 35 |
| 2. Side channel | Mean | 0.2 | 1.58 | — | — | — | — | — | 16.6 | 8.98 | 92 | 738 | 8 | 23.9 | 61 | 66.2 | 11 | 32.4 | 37.6 |
| | Median | 0.2 | 1.2 | — | — | — | — | — | 17.1 | 8.6 | 89 | 743 | 8 | 24 | 56 | 65.1 | 10.6 | 32.4 | 29.5 |
| | Minimum | 0.2 | 0.3 | — | — | — | — | — | 15.2 | 7.6 | 76 | 691 | 7.9 | 17 | 27 | 30.3 | 7 | 32.4 | 21.8 |
| | Maximum | 0.2 | 4.5 | — | — | — | — | — | 19.2 | 13 | 141 | 903 | 8.5 | 30 | 86 | 112 | 15.6 | 32.4 | 103 |
| | Std. dev. | 0 | 1.15 | — | — | — | — | — | 1.15 | 1.22 | 15 | 46.1 | 0.15 | 3.73 | 15.4 | 22.6 | 2.27 | — | 21 |
| | *N* obs. | 19 | 19 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 1 | 19 |
| 3. Backwater | Mean | 0.2 | 1.08 | 0 | — | — | — | — | 16.6 | 8.54 | 88 | 538 | 8.2 | 17 | 112 | 90.6 | 17.9 | 55.5 | 66.6 |
| | Median | 0.2 | 0.83 | 0 | — | — | — | — | 15.6 | 8.35 | 85 | 426 | 8.2 | 17.5 | 88 | 71.6 | 16.3 | 72.4 | 65.1 |
| | Minimum | 0.2 | 0.25 | 0 | — | — | — | — | 13.5 | 3.4 | 35 | 414 | 7.7 | 9 | 33 | 22.7 | 9.1 | 18.2 | 11.9 |
| | Maximum | 0.2 | 2.4 | 0 | — | — | — | — | 20.8 | 14.3 | 159 | 775 | 8.6 | 23 | 377 | 389 | 60.4 | 76.1 | 189 |
| | Std. dev. | 0 | 0.67 | 0 | — | — | — | — | 2.13 | 2.06 | 22.8 | 129 | 0.19 | 3.61 | 73.1 | 67.2 | 8.53 | 32.4 | 27.6 |
| | *N* obs. | 54 | 54 | 2 | 0 | 0 | 0 | 0 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 3 | 53 |
| **1996 Near-bottom measurements: fall** | | | | | | | | | | | | | | | | | | | |
| 2. Side channel | Mean | 1.99 | 2.19 | — | — | — | — | — | 16.4 | 8.99 | 92 | 738 | 8.1 | — | 73 | — | — | — | — |
| | Median | 2.2 | 2.4 | — | — | — | — | — | 16.5 | 8.8 | 91 | 742 | 8 | — | 68 | — | — | — | — |
| | Minimum | 1 | 1.2 | — | — | — | — | — | 15 | 7.6 | 76 | 692 | 7.9 | — | 30 | — | — | — | — |
| | Maximum | 4.3 | 4.5 | — | — | — | — | — | 18.7 | 12.6 | 135 | 902 | 8.5 | — | 150 | — | — | — | — |
| | Std. dev. | 1.01 | 1.01 | — | — | — | — | — | 1.11 | 1.34 | 15.9 | 57.3 | 0.17 | — | 30.6 | — | — | — | — |
| | *N* obs. | 12 | 12 | 0 | — | — | — | — | 12 | 12 | 12 | 12 | 12 | — | 12 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 1.52 | 1.73 | — | — | — | — | — | 15.8 | 8.06 | 81 | 484 | 8.1 | — | 103 | — | — | — | — |
| | Median | 1.6 | 1.8 | — | — | — | — | — | 15.2 | 8.3 | 83 | 422 | 8.2 | — | 99 | — | — | — | — |
| | Minimum | 0.8 | 1 | — | — | — | — | — | 14.3 | 3.6 | 37 | 417 | 7.6 | — | 40 | — | — | — | — |
| | Maximum | 2.2 | 2.4 | — | — | — | — | — | 19.8 | 10 | 98 | 716 | 8.3 | — | 149 | — | — | — | — |
| | Std. dev. | 0.38 | 0.38 | — | — | — | — | — | 1.48 | 1.51 | 14.5 | 107 | 0.17 | — | 25.5 | — | — | — | — |
| | *N* obs. | 25 | 25 | 0 | — | — | — | — | 25 | 25 | 25 | 25 | 25 | — | 22 | 0 | 0 | 0 | 0 |

**Table F-2.** Summaries of chemical measurements during each stratified random sampling episode from 1993 through 1996. Data are grouped into three sampling-depth categories: near surface (less than 0.2 m below the surface), middepth, and near bottom (less than 0.2 m above the substrate).

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements: summer** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 5.497 | 0.06 | 5.034 | 0.235 | 0.173 | — | — | — | — | — | — | — |
| | Median | 5.721 | 0.056 | 5.329 | 0.242 | 0.174 | — | — | — | — | — | — | — |
| | Minimum | 2.833 | 0.036 | 3.85 | 0.129 | 0.142 | — | — | — | — | — | — | — |
| | Maximum | 7.023 | 0.102 | 5.851 | 0.261 | 0.206 | — | — | — | — | — | — | — |
| | Std. dev. | 0.859 | 0.017 | 0.678 | 0.029 | 0.016 | — | — | — | — | — | — | — |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2. Side channel | Mean | 5.681 | 0.072 | 5.254 | 0.236 | 0.17 | — | — | — | — | — | — | — |
| | Median | 5.698 | 0.064 | 5.334 | 0.237 | 0.171 | — | — | — | — | — | — | — |
| | Minimum | 4.647 | 0.033 | 4.168 | 0.206 | 0.156 | — | — | — | — | — | — | — |
| | Maximum | 6.609 | 0.156 | 5.521 | 0.263 | 0.184 | — | — | — | — | — | — | — |
| | Std. dev. | 0.544 | 0.035 | 0.382 | 0.016 | 0.007 | — | — | — | — | — | — | — |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 5.498 | 0.077 | 4.623 | 0.221 | 0.166 | — | — | — | — | — | — | — |
| | Median | 5.467 | 0.077 | 4.494 | 0.219 | 0.162 | — | — | — | — | — | — | — |
| | Minimum | 4.283 | 0.032 | 3.677 | 0.185 | 0.153 | — | — | — | — | — | — | — |
| | Maximum | 7.313 | 0.131 | 5.68 | 0.268 | 0.207 | — | — | — | — | — | — | — |
| | Std. dev. | 0.594 | 0.026 | 0.641 | 0.018 | 0.013 | — | — | — | — | — | — | — |
| | *N* obs. | 42 | 43 | 43 | 42 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1993 Near-surface measurements: fall** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 5.34 | 0.079 | 3.412 | 0.32 | 0.154 | — | — | — | — | — | — | — |
| | Median | 5.199 | 0.075 | 3.243 | 0.322 | 0.146 | — | — | — | — | — | — | — |
| | Minimum | 3.896 | 0.075 | 3.243 | 0.152 | 0.146 | — | — | — | — | — | — | — |
| | Maximum | 7.173 | 0.083 | 3.58 | 0.435 | 0.161 | — | — | — | — | — | — | — |
| | Std. dev. | 0.707 | 0.006 | 0.238 | 0.058 | 0.011 | — | — | — | — | — | — | — |
| | *N* obs. | 19 | 2 | 2 | 19 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2. Side channel | Mean | 5.437 | — | — | 0.291 | — | — | — | — | — | — | — | — |
| | Median | 5.535 | — | — | 0.302 | — | — | — | — | — | — | — | — |
| | Minimum | 4.697 | — | — | 0.204 | — | — | — | — | — | — | — | — |
| | Maximum | 6.029 | — | — | 0.424 | — | — | — | — | — | — | — | — |
| | Std. dev. | 0.491 | — | — | 0.061 | — | — | — | — | — | — | — | — |
| | *N* obs. | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1993 Near-surface measurements: fall** | | | | | | | | | | | | | |
| 3. Backwater | Mean | 4.938 | — | — | 0.216 | — | — | — | — | — | — | — | — |
| | Median | 4.942 | — | — | 0.212 | — | — | — | — | — | — | — | — |
| | Minimum | 2.868 | — | — | 0.115 | — | — | — | — | — | — | — | — |
| | Maximum | 6.359 | — | — | 0.277 | — | — | — | — | — | — | — | — |
| | Std. dev. | 0.672 | — | — | 0.037 | — | — | — | — | — | — | — | — |
| | *N* obs. | 42 | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1994 Near-surface measurements: winter** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 3.949 | 0.462 | 5.637 | 0.3 | 0.286 | 4.129 | 76.06 | 4.07 | 34.1 | 69.77 | 92.5 | — |
| | Median | 3.994 | 0.456 | 5.755 | 0.298 | 0.294 | 4.164 | 83.6 | 4.2 | 35.05 | 63.8 | 90.88 | — |
| | Minimum | 3.451 | 0.395 | 4.298 | 0.256 | 0.209 | 3.774 | 11.5 | 3.2 | 25.99 | 49.04 | 69.87 | — |
| | Maximum | 4.487 | 0.81 | 6.15 | 0.377 | 0.347 | 4.408 | 93.75 | 5.51 | 36.74 | 107.2 | 118 | — |
| | Std. dev. | 0.254 | 0.089 | 0.472 | 0.031 | 0.043 | 0.192 | 19.14 | 0.685 | 2.773 | 18.08 | 13.15 | — |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 0 |
| 2. Side channel | Mean | 4.006 | 0.381 | 5.492 | 0.273 | 0.229 | 4.493 | 82.77 | 3.751 | 34.02 | 52.84 | 74.63 | — |
| | Median | 4.105 | 0.405 | 5.618 | 0.278 | 0.243 | 4.427 | 84.82 | 3.55 | 33.94 | 52.6 | 75.7 | — |
| | Minimum | 3 | 0.198 | 3.915 | 0.097 | 0.069 | 4.089 | 62.53 | 3.28 | 31.19 | 24.07 | 35.78 | — |
| | Maximum | 4.64 | 0.449 | 6.059 | 0.369 | 0.311 | 5.919 | 89.95 | 4.35 | 35.85 | 70.64 | 94.19 | — |
| | Std. dev. | 0.435 | 0.073 | 0.583 | 0.067 | 0.063 | 0.491 | 7.424 | 0.4 | 1.388 | 12.02 | 14.78 | — |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 0 |
| 3. Backwater | Mean | 2.844 | 0.219 | 3.717 | 0.133 | 0.103 | 4.352 | 72.07 | 3.229 | 28.55 | 32.15 | 47.41 | — |
| | Median | 3.41 | 0.181 | 4.546 | 0.125 | 0.091 | 4.112 | 77.4 | 3.34 | 31.09 | 35.45 | 52.29 | — |
| | Minimum | 0.804 | -0.02 | 0.892 | 0.053 | -0.01 | 1.962 | 42.66 | 1.35 | 17.9 | 5.02 | 8.724 | — |
| | Maximum | 4.063 | 0.551 | 5.444 | 0.321 | 0.271 | 6.259 | 87.45 | 4.32 | 36.15 | 58.89 | 101.7 | — |
| | Std. dev. | 1.11 | 0.163 | 1.605 | 0.066 | 0.082 | 0.997 | 12.31 | 0.616 | 6.056 | 16.58 | 25.46 | — |
| | *N* obs. | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 0 |
| **1994 Near-surface measurements: spring** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 5.011 | 0.053 | 4.544 | 0.217 | 0.028 | 2.18 | 64.99 | 3.531 | 26.86 | 28.31 | 44.95 | 57.89 |
| | Median | 5.054 | 0.044 | 4.71 | 0.219 | 0.025 | 2.216 | 63.29 | 3.51 | 25.7 | 25.43 | 42.62 | 55.19 |
| | Minimum | 4.125 | 0.029 | 3.698 | 0.155 | -0.01 | 1.33 | 54.95 | 2.73 | 22.82 | 10.86 | 19.95 | 33.88 |
| | Maximum | 5.813 | 0.101 | 5.41 | 0.268 | 0.059 | 3.072 | 72.66 | 4.41 | 29.79 | 40.07 | 61.33 | 72.59 |
| | Std. dev. | 0.461 | 0.024 | 0.511 | 0.025 | 0.015 | 0.553 | 6.293 | 0.482 | 2.62 | 8.67 | 12.66 | 11.96 |
| | *N* obs. | 19 | 18 | 18 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements: spring** | | | | | | | | | | | | | |
| 2. Side channel | Mean | 4.975 | 0.031 | 4.632 | 0.217 | 0.039 | 2.579 | 61.91 | 3.532 | 25.19 | 25.77 | 35.8 | 47.77 |
| | Median | 5.012 | -0.02 | 4.656 | 0.219 | 0.038 | 2.441 | 61.07 | 3.39 | 24.64 | 25.3 | 39.26 | 51.78 |
| | Minimum | 4.329 | -0.02 | 3.851 | 0.176 | 0.015 | 1.599 | 51.4 | 3.12 | 21.08 | 8.99 | 5.268 | 13.51 |
| | Maximum | 6.065 | 0.092 | 5.533 | 0.261 | 0.07 | 3.808 | 71.36 | 4.26 | 29.43 | 38.65 | 59.24 | 72.76 |
| | Std. dev. | 0.432 | 0.028 | 0.452 | 0.025 | 0.017 | 0.648 | 5.365 | 0.317 | 2.313 | 7.846 | 13.87 | 14.93 |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| 3. Backwater | Mean | 5.205 | 0.04 | 4.602 | 0.196 | 0.022 | 2.239 | 59.65 | 3.564 | 24.37 | 22.93 | 36.14 | 48.25 |
| | Median | 5.184 | 0.03 | 4.589 | 0.186 | 0.02 | 2.301 | 60.6 | 3.63 | 24.6 | 24.33 | 39.72 | 52.41 |
| | Minimum | 4.138 | -0.02 | 3.861 | 0.125 | -0.01 | 1.078 | 51.62 | 3.03 | 21.29 | 8.59 | 17.06 | 17.93 |
| | Maximum | 6.116 | 0.111 | 5.954 | 0.266 | 0.057 | 3.923 | 63.15 | 3.9 | 25.78 | 29.3 | 45.31 | 56.51 |
| | Std. dev. | 0.502 | 0.029 | 0.487 | 0.037 | 0.011 | 0.557 | 2.916 | 0.257 | 1.13 | 5.448 | 7.481 | 9.176 |
| | *N* obs. | 40 | 40 | 40 | 40 | 40 | 40 | 39 | 39 | 39 | 39 | 40 | 40 |
| **1994 Near-surface measurements: summer** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 3.35 | 0.101 | 1.392 | 0.241 | 0.118 | 1.558 | — | — | — | — | 48.86 | 61.83 |
| | Median | 2.872 | 0.089 | 1.694 | 0.238 | 0.127 | 1.609 | — | — | — | — | 48.62 | 61.04 |
| | Minimum | 2.606 | -0.02 | 0.591 | 0.176 | 0.042 | 1.003 | — | — | — | — | 46.2 | 59.33 |
| | Maximum | 11.18 | 0.192 | 1.856 | 0.312 | 0.149 | 2.276 | — | — | — | — | 51.95 | 65.49 |
| | Std. dev. | 1.912 | 0.045 | 0.436 | 0.029 | 0.029 | 0.381 | — | — | — | — | 1.53 | 2.168 |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 18 | 0 | 0 | 0 | 0 | 18 | 18 |
| 2. Side channel | Mean | 2.898 | 0.108 | 1.199 | 0.237 | 0.082 | 2.339 | — | — | — | — | 42.04 | 57.03 |
| | Median | 3.135 | 0.125 | 1.577 | 0.259 | 0.102 | 2.026 | — | — | — | — | 47.75 | 59.85 |
| | Minimum | 1.222 | -0.02 | -0.01 | 0.11 | -0.01 | -0.05 | — | — | — | — | 17.86 | 32.63 |
| | Maximum | 3.579 | 0.189 | 1.697 | 0.326 | 0.119 | 6.637 | — | — | — | — | 49.58 | 64.88 |
| | Std. dev. | 0.641 | 0.053 | 0.584 | 0.065 | 0.04 | 1.904 | — | — | — | — | 10.97 | 9.07 |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 11 | 0 | 0 | 0 | 0 | 11 | 11 |
| 3. Backwater | Mean | 1.675 | 0.042 | 0.464 | 0.219 | 0.045 | 2.253 | — | — | — | — | 27.1 | 46.61 |
| | Median | 1.557 | 0.032 | 0.364 | 0.229 | 0.04 | 2.053 | — | — | — | — | 32.7 | 46.52 |
| | Minimum | 0.88 | -0.02 | -0.01 | 0.068 | -0.01 | -0.05 | — | — | — | — | 7.24 | 26.38 |
| | Maximum | 2.54 | 0.161 | 1.524 | 0.423 | 0.162 | 6.637 | — | — | — | — | 49.05 | 63.16 |
| | Std. dev. | 0.468 | 0.041 | 0.453 | 0.084 | 0.036 | 2.058 | — | — | — | — | 17.33 | 11.32 |
| | *N* obs. | 35 | 37 | 37 | 35 | 37 | 37 | 0 | 0 | 0 | 0 | 37 | 37 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1994 Near-surface measurements: fall** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 3.483 | 0.073 | 2.118 | 0.353 | 0.162 | 1.759 | — | — | — | — | 55.32 | 70.81 |
| | Median | 3.515 | 0.066 | 2.103 | 0.327 | 0.156 | 1.922 | — | — | — | — | 56.36 | 71.22 |
| | Minimum | 3.063 | -0.02 | 1.894 | 0.236 | 0.094 | -0.05 | — | — | — | — | 47.1 | 57.02 |
| | Maximum | 4.226 | 0.191 | 2.246 | 0.499 | 0.209 | 2.068 | — | — | — | — | 58.92 | 78.13 |
| | Std. dev. | 0.274 | 0.039 | 0.084 | 0.081 | 0.028 | 0.471 | — | — | — | — | 3.258 | 5.204 |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 19 | 0 | 0 | 0 | 0 | 19 | 19 |
| 2. Side channel | Mean | 3.345 | 0.072 | 1.895 | 0.329 | 0.115 | 1.96 | — | — | — | — | 53.57 | 68.28 |
| | Median | 3.503 | 0.072 | 2.014 | 0.331 | 0.119 | 1.943 | — | — | — | — | 55.21 | 68.96 |
| | Minimum | 2.03 | -0.02 | 0.376 | 0.284 | 0.02 | 1.765 | — | — | — | — | 36.7 | 48.89 |
| | Maximum | 3.767 | 0.119 | 2.303 | 0.372 | 0.157 | 2.183 | — | — | — | — | 59.94 | 83.68 |
| | Std. dev. | 0.47 | 0.028 | 0.513 | 0.028 | 0.036 | 0.11 | — | — | — | — | 6.195 | 8.407 |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 11 | 0 | 0 | 0 | 0 | 11 | 11 |
| 3. Backwater | Mean | 2.112 | 0.071 | 0.364 | 0.318 | 0.031 | 1.462 | — | — | — | — | 26.52 | 48.94 |
| | Median | 2.004 | -0.02 | 0.13 | 0.264 | 0.02 | 0.073 | — | — | — | — | 9.066 | 46.8 |
| | Minimum | 1.513 | -0.02 | -0.01 | 0.137 | -0.01 | -0.05 | — | — | — | — | 3.034 | 14.85 |
| | Maximum | 3.106 | 1.018 | 2.412 | 0.977 | 0.125 | 6.73 | — | — | — | — | 57.33 | 84.99 |
| | Std. dev. | 0.489 | 0.188 | 0.615 | 0.172 | 0.027 | 2.315 | — | — | — | — | 21.7 | 16.65 |
| | *N* obs. | 31 | 31 | 31 | 31 | 31 | 31 | 0 | 0 | 0 | 0 | 31 | 31 |
| **1995 Near-surface measurements: winter** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 6.059 | 0.21 | 5.271 | 0.191 | 0.087 | 3.796 | — | — | — | — | 71.75 | 71.76 |
| | Median | 6.074 | 0.21 | 5.283 | 0.189 | 0.088 | 3.831 | — | — | — | — | 73.98 | 72.41 |
| | Minimum | 5.514 | 0.107 | 4.964 | 0.147 | 0.042 | 3.607 | — | — | — | — | 61.53 | 60.67 |
| | Maximum | 6.524 | 0.294 | 5.569 | 0.249 | 0.128 | 3.94 | — | — | — | — | 81.25 | 82.45 |
| | Std. dev. | 0.33 | 0.044 | 0.185 | 0.022 | 0.024 | 0.102 | — | — | — | — | 6.937 | 7.985 |
| | *N* obs. | 15 | 15 | 15 | 15 | 15 | 15 | 0 | 0 | 0 | 0 | 15 | 15 |
| 2. Side channel | Mean | 5.45 | 0.242 | 5.65 | 0.206 | 0.114 | 3.965 | — | — | — | — | 64.89 | 61 |
| | Median | 6.455 | 0.261 | 5.818 | 0.203 | 0.128 | 3.968 | — | — | — | — | 65.7 | 62.01 |
| | Minimum | -0.1 | 0.064 | 5.205 | 0.169 | 0.071 | 3.751 | — | — | — | — | 54.64 | 54.16 |
| | Maximum | 7.927 | 0.282 | 5.964 | 0.28 | 0.139 | 4.19 | — | — | — | — | 68.72 | 65.41 |
| | Std. dev. | 2.78 | 0.061 | 0.294 | 0.037 | 0.025 | 0.118 | — | — | — | — | 4.019 | 3.584 |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 11 | 0 | 0 | 0 | 0 | 11 | 11 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-surface measurements: winter** | | | | | | | | | | | | | |
| 3. Backwater | Mean | 3.079 | 0.14 | 4.331 | 0.168 | 0.092 | 3.695 | — | — | — | — | 48.54 | 51.43 |
| | Median | 3.37 | 0.13 | 5.1 | 0.18 | 0.099 | 3.73 | — | — | — | — | 50.13 | 54.77 |
| | Minimum | -0.1 | -0.02 | -0.01 | 0.094 | 0.016 | 1.865 | — | — | — | — | 21.45 | 23.15 |
| | Maximum | 8.133 | 0.305 | 5.771 | 0.214 | 0.2 | 4.58 | — | — | — | — | 65.04 | 61.96 |
| | Std. dev. | 2.892 | 0.088 | 1.558 | 0.031 | 0.045 | 0.495 | — | — | — | — | 12.91 | 9.99 |
| | *N* obs. | 39 | 36 | 24 | 39 | 39 | 39 | 0 | 0 | 0 | 0 | 39 | 39 |
| **1995 Near-surface measurements: spring** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 6.378 | 0.052 | 6.169 | 0.211 | 0.045 | 3.109 | — | — | — | — | 55.44 | 65.21 |
| | Median | 6.325 | 0.047 | 6.012 | 0.208 | 0.044 | 3.286 | — | — | — | — | 53.22 | 65.48 |
| | Minimum | 5.866 | -0.02 | 5.567 | 0.177 | 0.024 | 2.532 | — | — | — | — | 45.98 | 56.57 |
| | Maximum | 7.381 | 0.108 | 7.113 | 0.277 | 0.08 | 3.559 | — | — | — | — | 67.02 | 81.44 |
| | Std. dev. | 0.458 | 0.027 | 0.491 | 0.023 | 0.014 | 0.416 | — | — | — | — | 6.355 | 7.031 |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 16 | 0 | 0 | 0 | 0 | 16 | 16 |
| 2. Side channel | Mean | 6.598 | 0.041 | 6.514 | 0.207 | 0.046 | 3.327 | — | — | — | — | 43.71 | 52.52 |
| | Median | 6.491 | 0.036 | 6.374 | 0.202 | 0.05 | 3.249 | — | — | — | — | 48.01 | 55.05 |
| | Minimum | 6.147 | -0.02 | 6.028 | 0.125 | 0.017 | 3.093 | — | — | — | — | 26.68 | 38.83 |
| | Maximum | 7.517 | 0.093 | 7.564 | 0.312 | 0.075 | 3.628 | — | — | — | — | 49.98 | 57.78 |
| | Std. dev. | 0.444 | 0.028 | 0.486 | 0.05 | 0.019 | 0.19 | — | — | — | — | 9.133 | 7.134 |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 10 | 0 | 0 | 0 | 0 | 10 | 10 |
| 3. Backwater | Mean | 6.045 | 0.032 | 5.597 | 0.182 | 0.028 | 2.852 | — | — | — | — | 49.75 | 60.62 |
| | Median | 6.013 | 0.026 | 5.649 | 0.17 | 0.026 | 2.844 | — | — | — | — | 49.71 | 61.1 |
| | Minimum | 5.616 | -0.02 | 3.987 | 0.125 | -0.01 | 2.2 | — | — | — | — | 35.05 | 42.49 |
| | Maximum | 6.725 | 0.216 | 6.449 | 0.331 | 0.09 | 3.436 | — | — | — | — | 63.43 | 75.57 |
| | Std. dev. | 0.24 | 0.037 | 0.431 | 0.04 | 0.014 | 0.253 | — | — | — | — | 5.683 | 6.557 |
| | *N* obs. | 43 | 43 | 43 | 43 | 43 | 26 | 0 | 0 | 0 | 0 | 26 | 26 |
| **1995 Near-surface measurements: summer** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 4.055 | 0.236 | 2.411 | 0.328 | 0.116 | — | — | — | — | — | — | — |
| | Median | 3.894 | 0.215 | 2.438 | 0.33 | 0.12 | — | — | — | — | — | — | — |
| | Minimum | 3.382 | 0.126 | 1.2 | 0.082 | 0.071 | — | — | — | — | — | — | — |
| | Maximum | 6.996 | 0.404 | 2.798 | 0.62 | 0.152 | — | — | — | — | — | — | — |
| | Std. dev. | 0.746 | 0.084 | 0.335 | 0.1 | 0.023 | — | — | — | — | — | — | — |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995 Near-surface measurements: summer** | | | | | | | | | | | | | |
| 2. Side channel | Mean | 3.862 | 0.236 | 2.355 | 0.382 | 0.106 | — | — | — | — | — | — | — |
| | Median | 3.841 | 0.218 | 2.343 | 0.37 | 0.109 | — | — | — | — | — | — | — |
| | Minimum | 3.592 | 0.2 | 2.123 | 0.298 | 0.072 | — | — | — | — | — | — | — |
| | Maximum | 4.133 | 0.287 | 2.632 | 0.55 | 0.145 | — | — | — | — | — | — | — |
| | Std. dev. | 0.183 | 0.032 | 0.166 | 0.075 | 0.022 | — | — | — | — | — | — | — |
| | *N* obs. | 11 | 10 | 10 | 11 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 2.498 | 0.243 | 0.33 | 0.623 | 0.072 | — | — | — | — | — | — | — |
| | Median | 2.397 | 0.138 | 0.039 | 0.382 | 0.042 | — | — | — | — | — | — | — |
| | Minimum | 1.544 | -0.02 | -0.01 | 0.157 | -0.01 | — | — | — | — | — | — | — |
| | Maximum | 4.804 | 2.951 | 2.995 | 5.926 | 0.37 | — | — | — | — | — | — | — |
| | Std. dev. | 0.69 | 0.466 | 0.608 | 0.906 | 0.081 | — | — | — | — | — | — | — |
| | *N* obs. | 40 | 40 | 40 | 40 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1995 Near-surface measurements: fall** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 4.59 | 0.203 | 2.724 | 0.484 | 0.203 | 1.386 | — | — | — | — | 82.17 | 92.65 |
| | Median | 4.616 | 0.183 | 2.684 | 0.468 | 0.205 | 1.311 | — | — | — | — | 81.06 | 90.34 |
| | Minimum | 4.331 | 0.156 | 2.528 | 0.343 | 0.139 | 1.186 | — | — | — | — | 72.39 | 79.68 |
| | Maximum | 4.897 | 0.294 | 2.989 | 0.654 | 0.26 | 1.583 | — | — | — | — | 104.3 | 117.4 |
| | Std. dev. | 0.151 | 0.044 | 0.146 | 0.076 | 0.039 | 0.157 | — | — | — | — | 8.272 | 9.483 |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 10 | 0 | 0 | 0 | 0 | 10 | 10 |
| 2. Side channel | Mean | 4.331 | 0.217 | 2.506 | 0.431 | 0.154 | 1.784 | — | — | — | — | 81.72 | 98.12 |
| | Median | 4.374 | 0.201 | 2.726 | 0.45 | 0.162 | 1.584 | — | — | — | — | 77.55 | 88.15 |
| | Minimum | 4.03 | 0.157 | 2.177 | 0.343 | 0.098 | 1.358 | — | — | — | — | 62.45 | 72.89 |
| | Maximum | 4.681 | 0.288 | 2.776 | 0.495 | 0.185 | 2.589 | — | — | — | — | 113.5 | 151.4 |
| | Std. dev. | 0.25 | 0.047 | 0.28 | 0.051 | 0.03 | 0.457 | — | — | — | — | 16.91 | 26 |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 8 | 0 | 0 | 0 | 0 | 8 | 8 |
| 3. Backwater | Mean | 2.247 | 0.102 | 0.179 | 0.271 | 0.023 | 2.054 | — | — | — | — | 36.93 | 59.34 |
| | Median | 2.213 | 0.058 | 0.02 | 0.203 | 0.018 | 0.528 | — | — | — | — | 22.61 | 50.83 |
| | Minimum | 1.236 | 0.029 | -0.01 | 0.084 | -0.01 | 0.287 | — | — | — | — | 8.491 | 41.66 |
| | Maximum | 3.834 | 0.462 | 1.762 | 0.625 | 0.053 | 7.197 | — | — | — | — | 66.69 | 79.51 |
| | Std. dev. | 0.761 | 0.112 | 0.421 | 0.178 | 0.015 | 2.731 | — | — | — | — | 26.45 | 15.22 |
| | *N* obs. | 26 | 26 | 26 | 26 | 26 | 6 | 0 | 0 | 0 | 0 | 6 | 6 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements: winter** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 6.068 | 0.734 | 3.972 | 0.332 | 0.27 | 2.428 | — | — | — | — | 133.2 | 86.85 |
| | Median | 5.928 | 0.82 | 3.976 | 0.299 | 0.221 | 2.462 | — | — | — | — | 140.4 | 95.31 |
| | Minimum | 5.319 | 0.412 | 3.529 | 0.233 | 0.195 | 2.319 | — | — | — | — | 116.3 | 68.74 |
| | Maximum | 7.944 | 0.95 | 4.468 | 0.508 | 0.43 | 2.502 | — | — | — | — | 142.9 | 96.49 |
| | Std. dev. | 0.68 | 0.174 | 0.284 | 0.09 | 0.101 | 0.096 | — | — | — | — | 14.66 | 15.69 |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 3 | 0 | 0 | 0 | 0 | 3 | 3 |
| 2. Side channel | Mean | 5.705 | 0.95 | 3.306 | 0.271 | 0.211 | — | — | — | — | — | — | — |
| | Median | 5.731 | 0.94 | 3.304 | 0.27 | 0.213 | — | — | — | — | — | — | — |
| | Minimum | 5.353 | 0.87 | 3.166 | 0.223 | 0.17 | — | — | — | — | — | — | — |
| | Maximum | 6.101 | 1.12 | 3.433 | 0.32 | 0.249 | — | — | — | — | — | — | — |
| | Std. dev. | 0.241 | 0.071 | 0.086 | 0.031 | 0.024 | — | — | — | — | — | — | — |
| | *N* obs. | 9 | 9 | 9 | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. Backwater | Mean | 2.424 | 0.131 | 1.246 | 0.081 | 0.046 | — | — | — | — | — | — | — |
| | Median | 1.928 | 0.04 | 0.923 | 0.049 | 0.017 | — | — | — | — | — | — | — |
| | Minimum | 1.249 | 0.024 | 0.02 | 0.021 | -0.01 | — | — | — | — | — | — | — |
| | Maximum | 5.255 | 0.71 | 3 | 0.257 | 0.29 | — | — | — | — | — | — | — |
| | Std. dev. | 1.259 | 0.203 | 0.928 | 0.073 | 0.079 | — | — | — | — | — | — | — |
| | *N* obs. | 20 | 20 | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1996 Near-surface measurements: spring** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 5.784 | — | 4.287 | 0.566 | 0.179 | — | — | — | — | — | — | — |
| | Median | 5.859 | — | 4.233 | 0.495 | 0.174 | — | — | — | — | — | — | — |
| | Minimum | 4.771 | — | 0.036 | 0.323 | 0.131 | — | — | — | — | — | — | — |
| | Maximum | 6.584 | — | 7.609 | 0.999 | 0.261 | — | — | — | — | — | — | — |
| | Std. dev. | 0.549 | — | 1.87 | 0.214 | 0.039 | — | — | — | — | — | — | — |
| | *N* obs. | 19 | 0 | 19 | 19 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2. Side channel | Mean | 5.764 | — | 4.21 | 0.475 | 0.177 | — | — | — | — | — | — | — |
| | Median | 5.738 | — | 4.308 | 0.461 | 0.176 | — | — | — | — | — | — | — |
| | Minimum | 4.664 | — | 3.607 | 0.263 | 0.081 | — | — | — | — | — | — | — |
| | Maximum | 6.622 | — | 4.527 | 0.738 | 0.274 | — | — | — | — | — | — | — |
| | Std. dev. | 0.5 | — | 0.307 | 0.112 | 0.049 | — | — | — | — | — | — | — |
| | *N* obs. | 11 | 0 | 11 | 11 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements: spring** | | | | | | | | | | | | | |
| 3. Backwater | Mean | 4.578 | — | 3.606 | 0.315 | 0.078 | — | — | — | — | — | — | — |
| | Median | 5.168 | — | 4.087 | 0.26 | 0.065 | — | — | — | — | — | — | — |
| | Minimum | 1.606 | — | 0.044 | 0.127 | 0.016 | — | — | — | — | — | — | — |
| | Maximum | 7.295 | — | 7.488 | 1.014 | 0.197 | — | — | — | — | — | — | — |
| | Std. dev. | 1.579 | — | 2.049 | 0.234 | 0.051 | — | — | — | — | — | — | — |
| | *N* obs. | 43 | 0 | 43 | 35 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1996 Near-surface measurements: summer** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 4.666 | 0.126 | 3.908 | 0.387 | 0.088 | 3.302 | — | — | — | — | 36.94 | 34.91 |
| | Median | 4.929 | 0.064 | 4.47 | 0.261 | 0.09 | 3.537 | — | — | — | — | 33.88 | 34.72 |
| | Minimum | 3.55 | 0.041 | 2.319 | 0.226 | 0.043 | 1.887 | — | — | — | — | 28.72 | 30.97 |
| | Maximum | 5.729 | 0.265 | 5.245 | 0.77 | 0.14 | 3.87 | — | — | — | — | 68.72 | 37.69 |
| | Std. dev. | 0.713 | 0.092 | 1.168 | 0.193 | 0.025 | 0.64 | — | — | — | — | 12.1 | 2.145 |
| | *N* obs. | 19 | 19 | 19 | 19 | 19 | 9 | 0 | 0 | 0 | 0 | 9 | 9 |
| 2. Side channel | Mean | 4.073 | 0.216 | 2.763 | 0.657 | 0.066 | 2.044 | — | — | — | — | 29.51 | 38.29 |
| | Median | 3.924 | 0.245 | 2.396 | 0.68 | 0.066 | 2.044 | — | — | — | — | 29.51 | 38.29 |
| | Minimum | 3.581 | 0.068 | 2.313 | 0.239 | 0.042 | 2.044 | — | — | — | — | 29.51 | 38.29 |
| | Maximum | 5.463 | 0.255 | 4.962 | 1.03 | 0.104 | 2.044 | — | — | — | — | 29.51 | 38.29 |
| | Std. dev. | 0.559 | 0.065 | 0.888 | 0.233 | 0.02 | — | — | — | — | — | — | — |
| | *N* obs. | 11 | 11 | 11 | 11 | 11 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 3. Backwater | Mean | 3.186 | 0.136 | 2.353 | 0.297 | 0.081 | 1.896 | — | — | — | — | 40.18 | 44.89 |
| | Median | 3.27 | 0.152 | 2.417 | 0.308 | 0.083 | 1.873 | — | — | — | — | 35.07 | 46.54 |
| | Minimum | 2.398 | -0.02 | 1.318 | 0.138 | -0.01 | 1.138 | — | — | — | — | 29.02 | 34.35 |
| | Maximum | 4.065 | 0.277 | 3.335 | 0.49 | 0.158 | 2.453 | — | — | — | — | 56.31 | 53.42 |
| | Std. dev. | 0.321 | 0.091 | 0.392 | 0.068 | 0.037 | 0.348 | — | — | — | — | 9.509 | 7.164 |
| | *N* obs. | 43 | 43 | 43 | 43 | 43 | 10 | 0 | 0 | 0 | 0 | 10 | 10 |
| **1996 Near-surface measurements: fall** | | | | | | | | | | | | | |
| 1. Main channel | Mean | 3.374 | 0.07 | 2.438 | — | 0.145 | 1.247 | — | — | — | — | 75.81 | 61.37 |
| | Median | 3.212 | 0.079 | 2.491 | — | 0.145 | 1.239 | — | — | — | — | 75.01 | 62.31 |
| | Minimum | 2.805 | -0.02 | 2.023 | — | 0.093 | 0.986 | — | — | — | — | 74.89 | 54.99 |
| | Maximum | 5.854 | 0.125 | 2.835 | — | 0.225 | 1.42 | — | — | — | — | 77.09 | 65.44 |
| | Std. dev. | 0.628 | 0.039 | 0.197 | — | 0.032 | 0.189 | — | — | — | — | 1.051 | 4.474 |
| | *N* obs. | 19 | 19 | 19 | 0 | 19 | 4 | 0 | 0 | 0 | 0 | 4 | 4 |

**Table F-2.** Continued.

| Sampling stratum | Statistic | Total nitrogen (N mg/L) | Ammonium (N mg/L) | Nitrate–nitrite (N mg/L) | Total phosphorus (P mg/L) | Soluble reactive P (P mg/L) | Silica (Si mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Chloride (mg/L) | Sulfate (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1996 Near-surface measurements: fall** | | | | | | | | | | | | | |
| 2. Side channel | Mean | 3.121 | 0.083 | 2.261 | — | 0.139 | 1.378 | — | — | — | — | 74.47 | 63.13 |
| | Median | 3.233 | 0.074 | 2.432 | — | 0.128 | 1.181 | — | — | — | — | 74.29 | 63.13 |
| | Minimum | 1.849 | 0.029 | 0.692 | — | 0.077 | 1.181 | — | — | — | — | 74.29 | 63.13 |
| | Maximum | 3.434 | 0.139 | 2.569 | — | 0.22 | 1.574 | — | — | — | — | 74.64 | 63.14 |
| | Std. dev. | 0.454 | 0.042 | 0.563 | — | 0.044 | 0.278 | — | — | — | — | 0.251 | 0.008 |
| | *N* obs. | 10 | 10 | 10 | 0 | 10 | 2 | 0 | 0 | 0 | 0 | 2 | 2 |
| 3. Backwater | Mean | 1.826 | 0.069 | 0.277 | — | 0.022 | 1.179 | — | — | — | — | 41.58 | 43.86 |
| | Median | 1.491 | 0.048 | -0.01 | — | -0.01 | 1.122 | — | — | — | — | 22.14 | 32.45 |
| | Minimum | 1.089 | -0.02 | -0.01 | — | -0.01 | 0.915 | — | — | — | — | 21.06 | 31.88 |
| | Maximum | 4.298 | 0.3 | 2.966 | — | 0.172 | 1.645 | — | — | — | — | 72.7 | 62.42 |
| | Std. dev. | 0.748 | 0.062 | 0.629 | — | 0.039 | 0.284 | — | — | — | — | 27.41 | 15.95 |
| | *N* obs. | 30 | 30 | 30 | 0 | 30 | 5 | 0 | 0 | 0 | 0 | 5 | 5 |

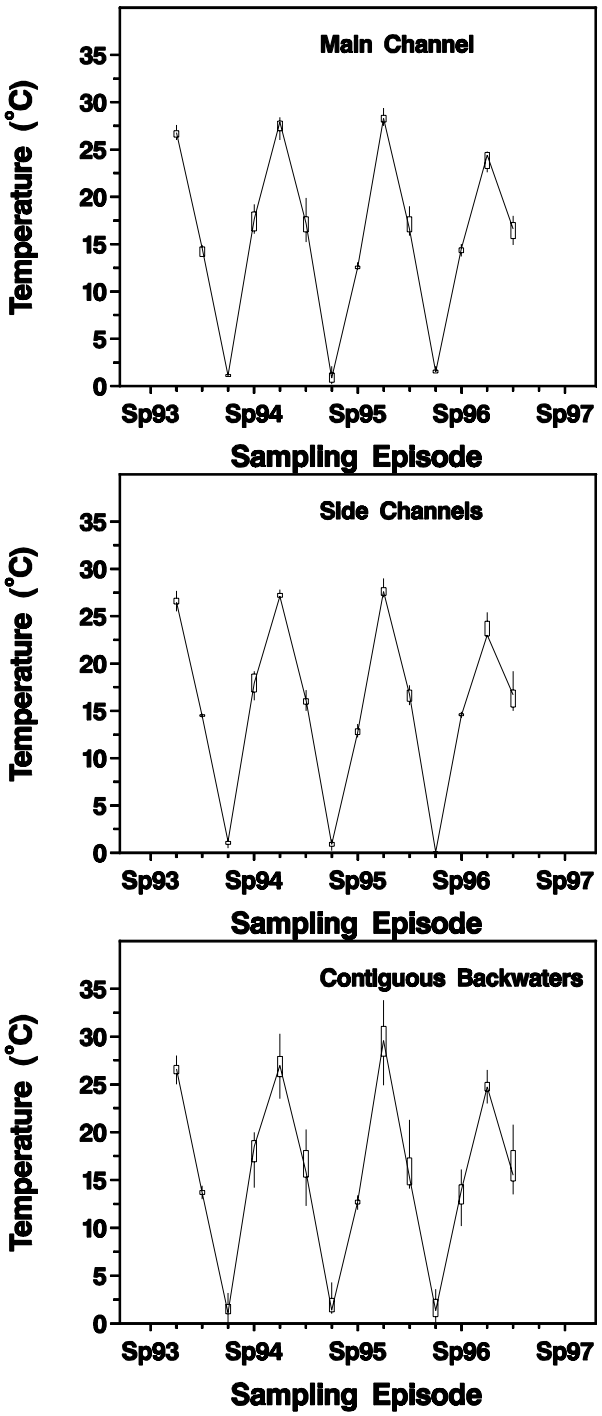


**Figure F-1.** Water temperature (°C) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

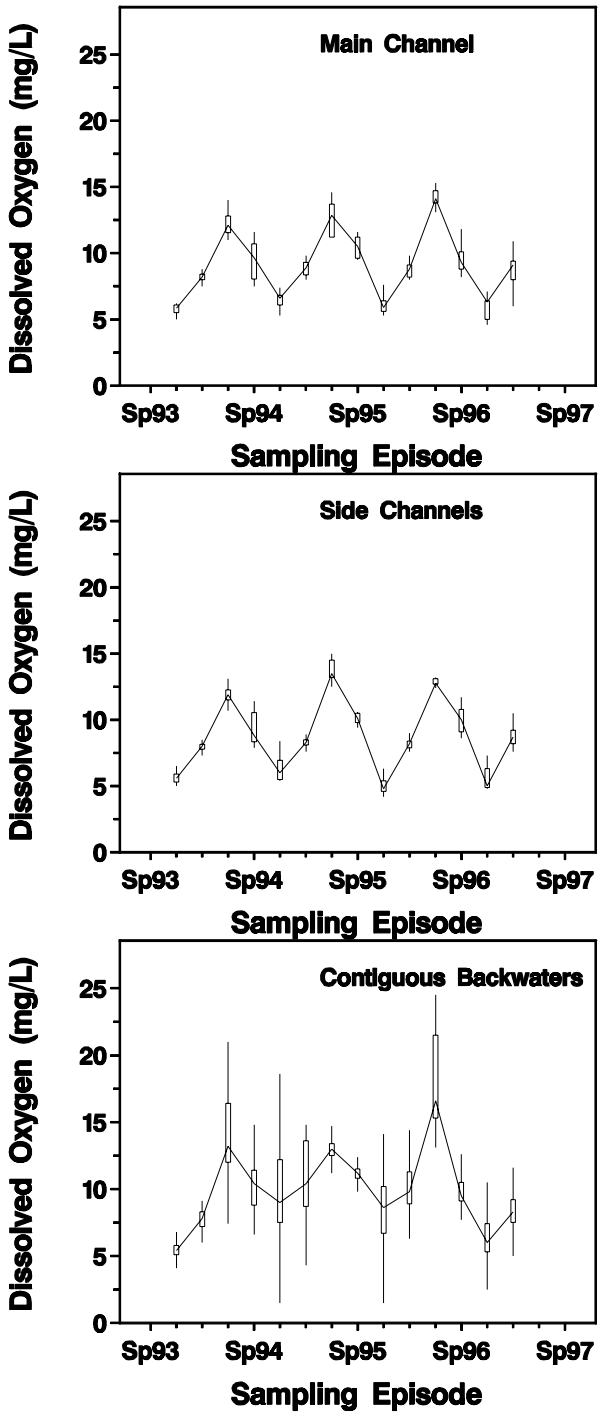


**Figure F-2.** Dissolved oxygen (mg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

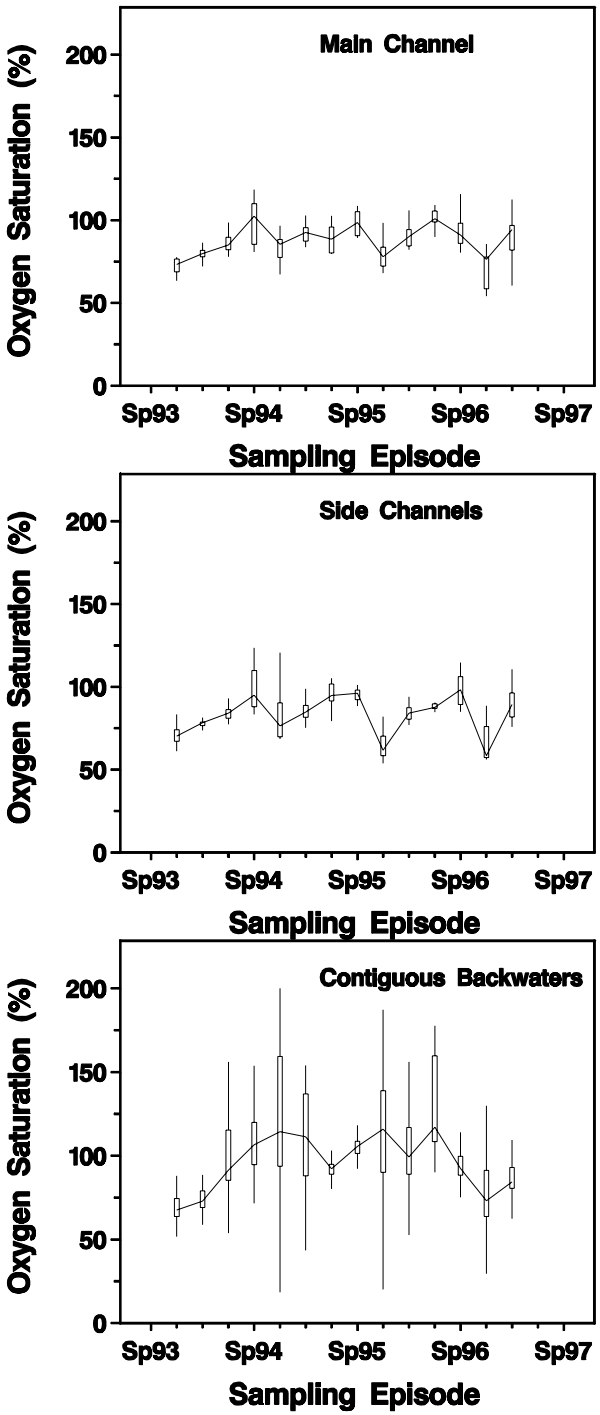


**Figure F-3.** Dissolved oxygen saturation (%) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

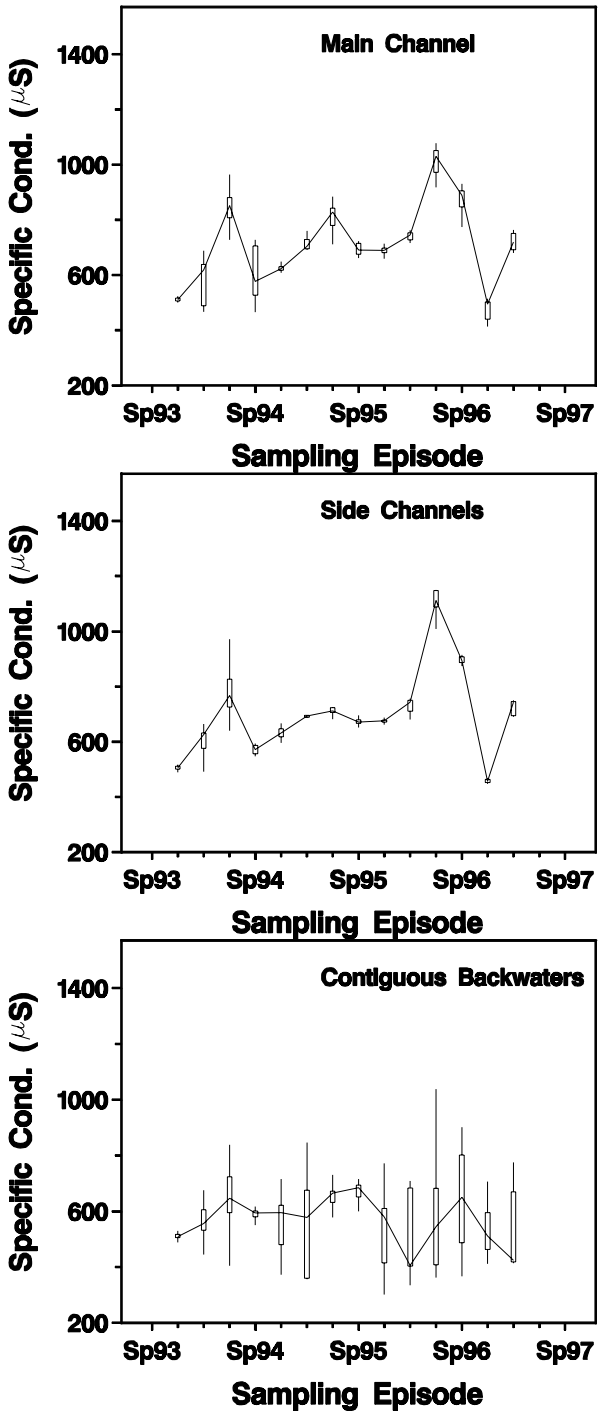


**Figure F-4.** Specfic conductivity (μS) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

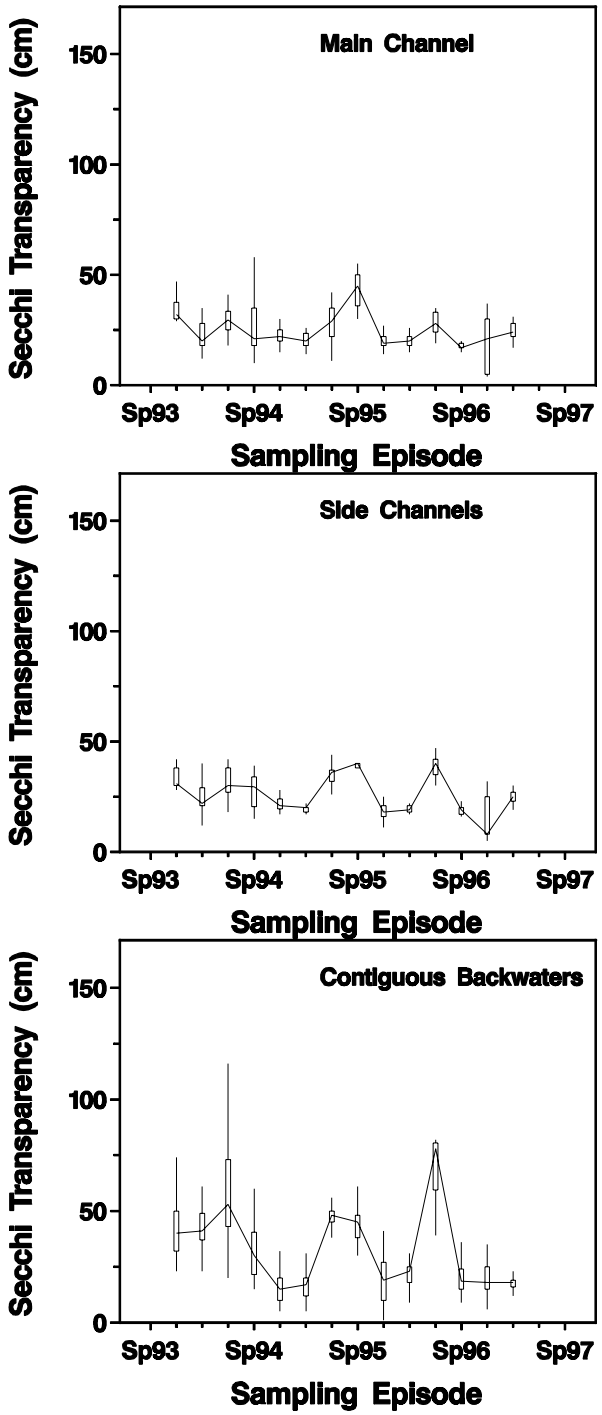


**Figure F-5.** Secchi disk transparency (cm) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

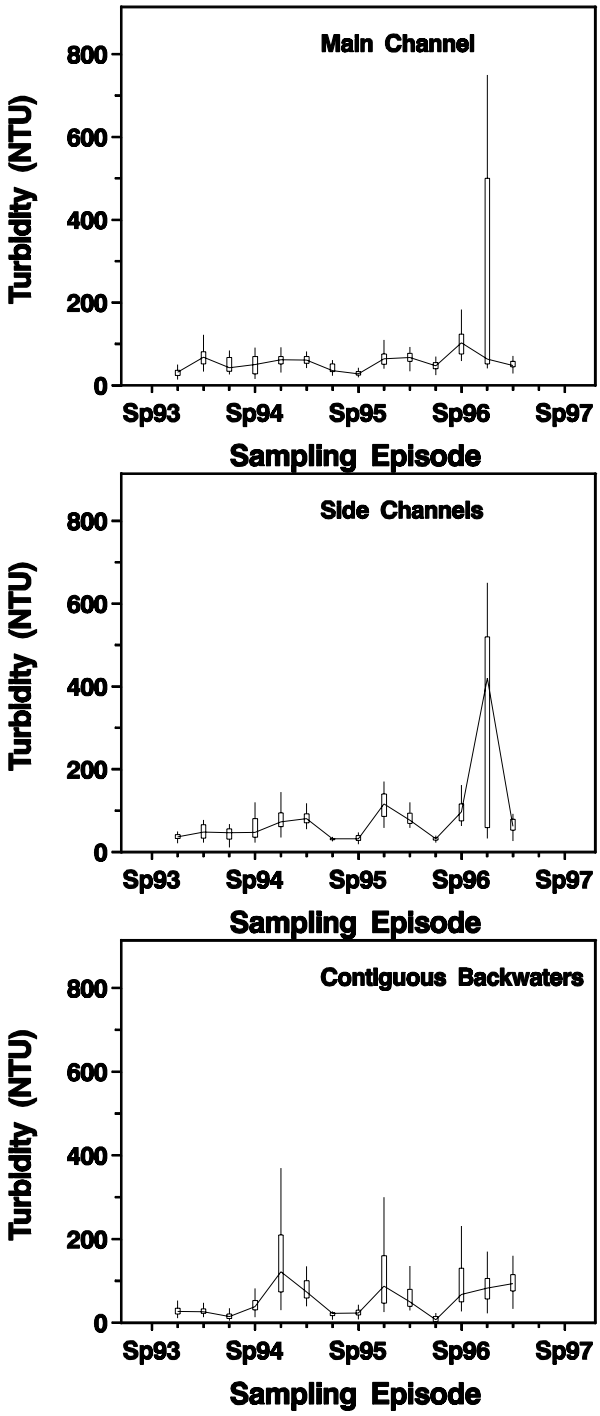


**Figure F-6.** Turbidity (NTU) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

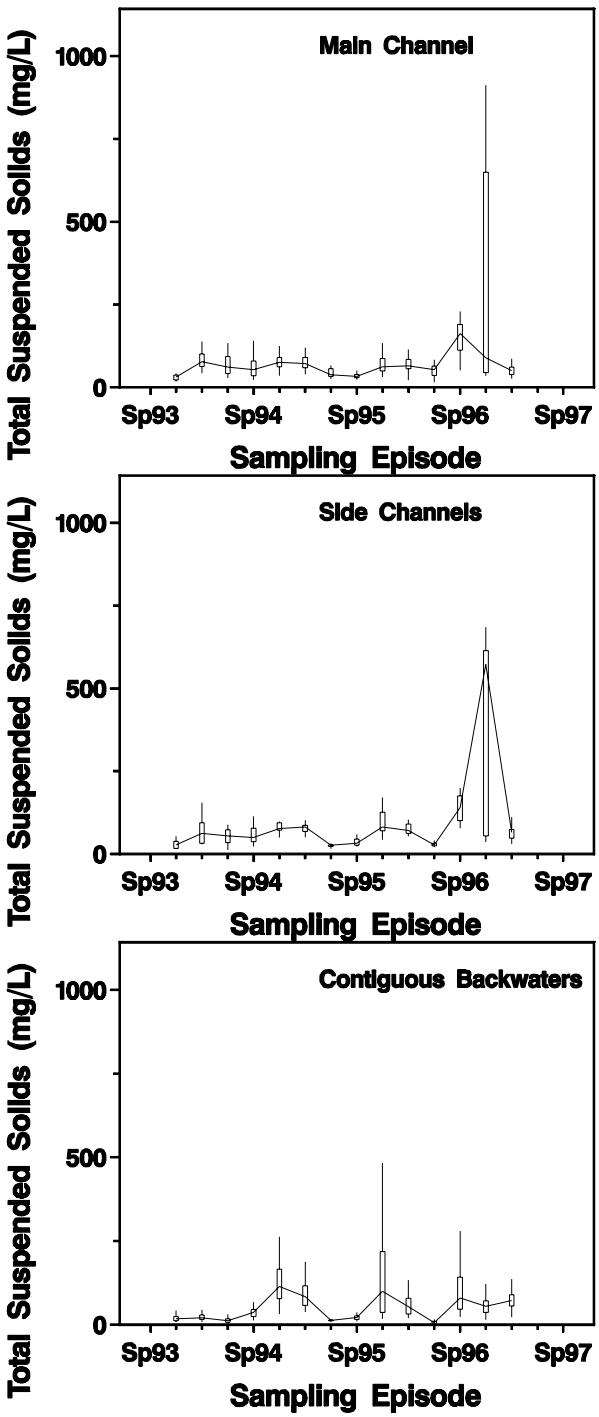


**Figure F-7.** Total suspended solids (mg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

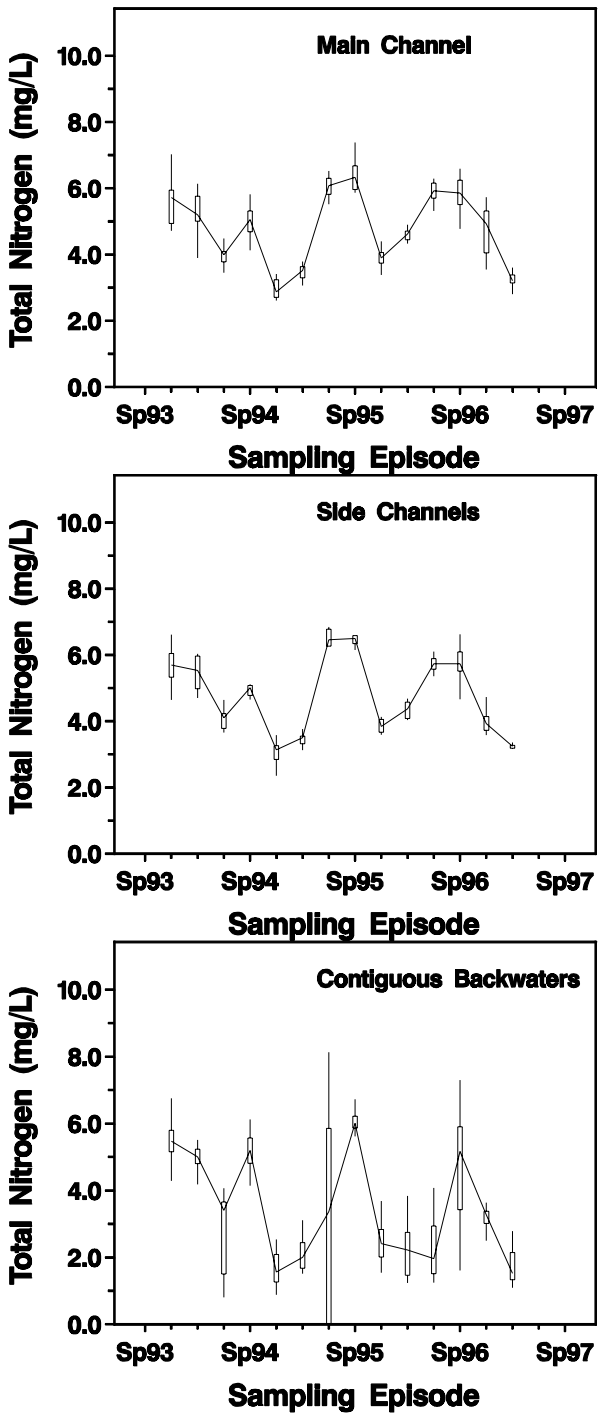


**Figure F-8**. Total nitrogen (mg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

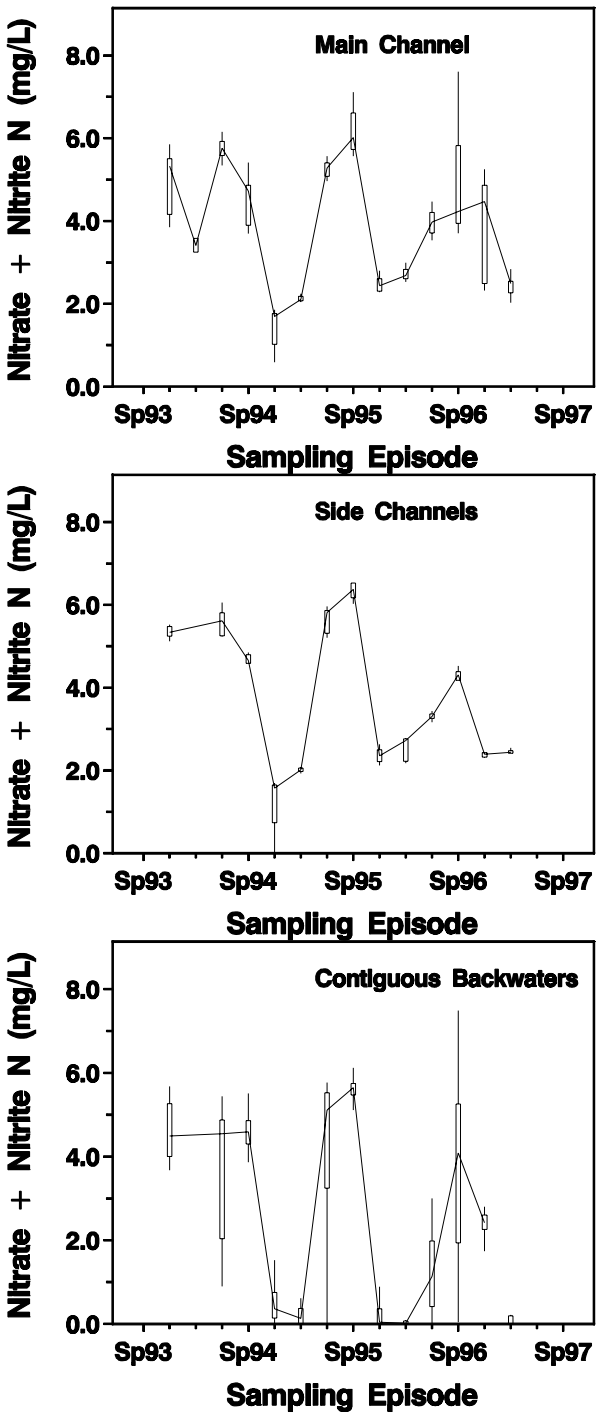


**Figure F-9.** Nitrate–nitrite nitrogen (mg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

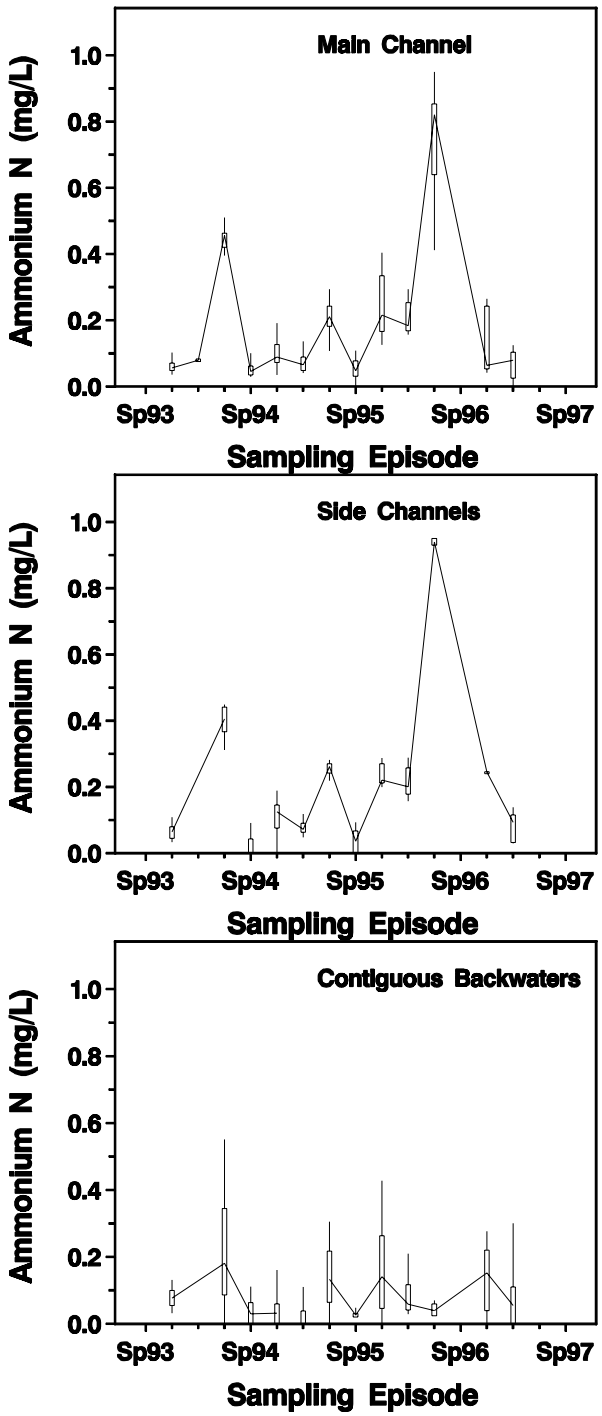


**Figure F-10.** Ammonium nitrogen (mg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

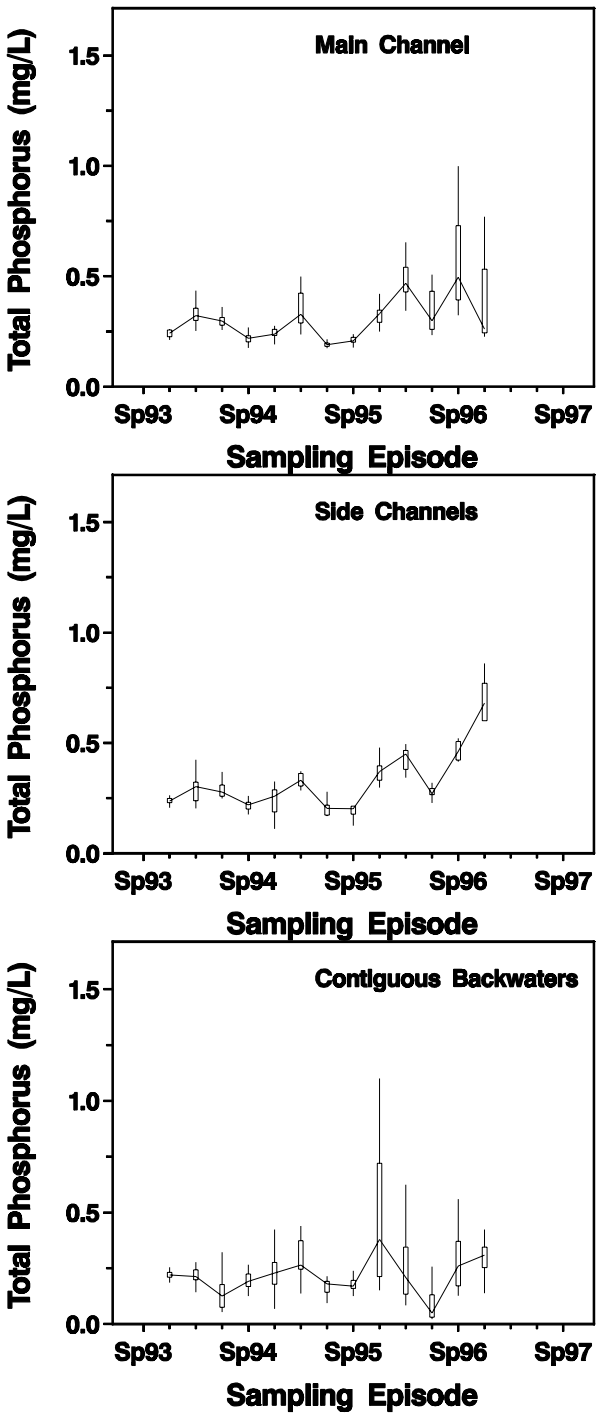


**Figure F-11.** Total phosphorus (mg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

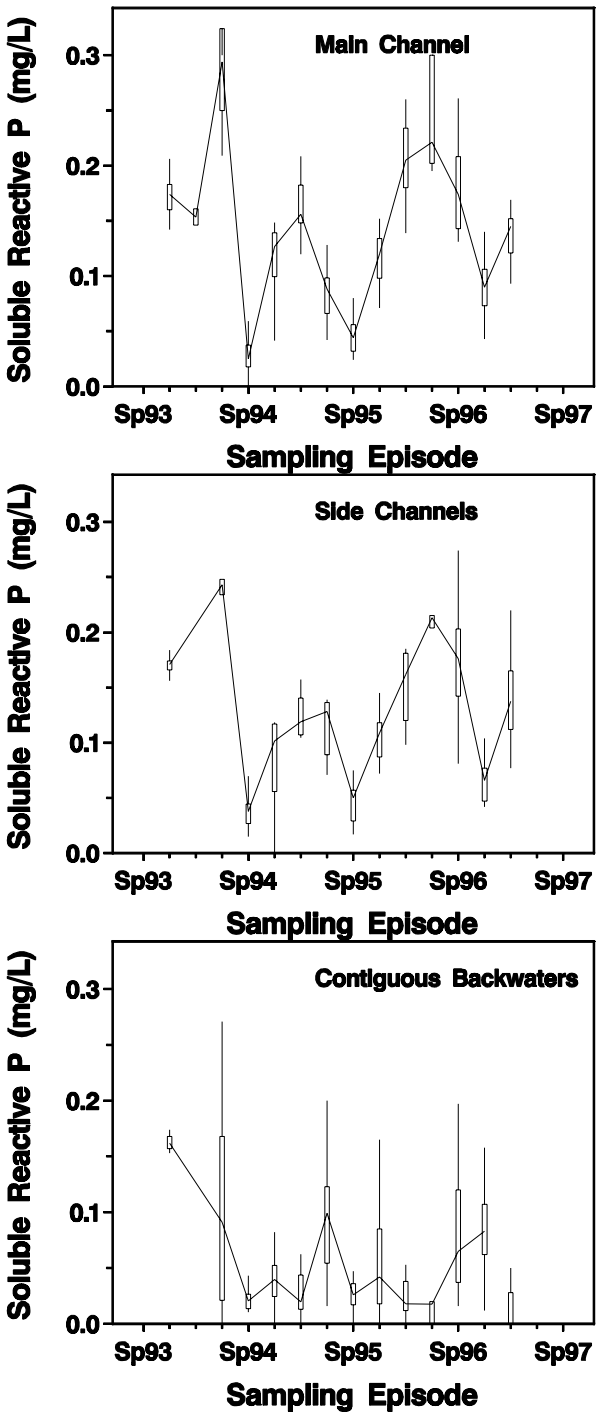


**Figure F-12.** Soluble reactive phosphorus (mg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

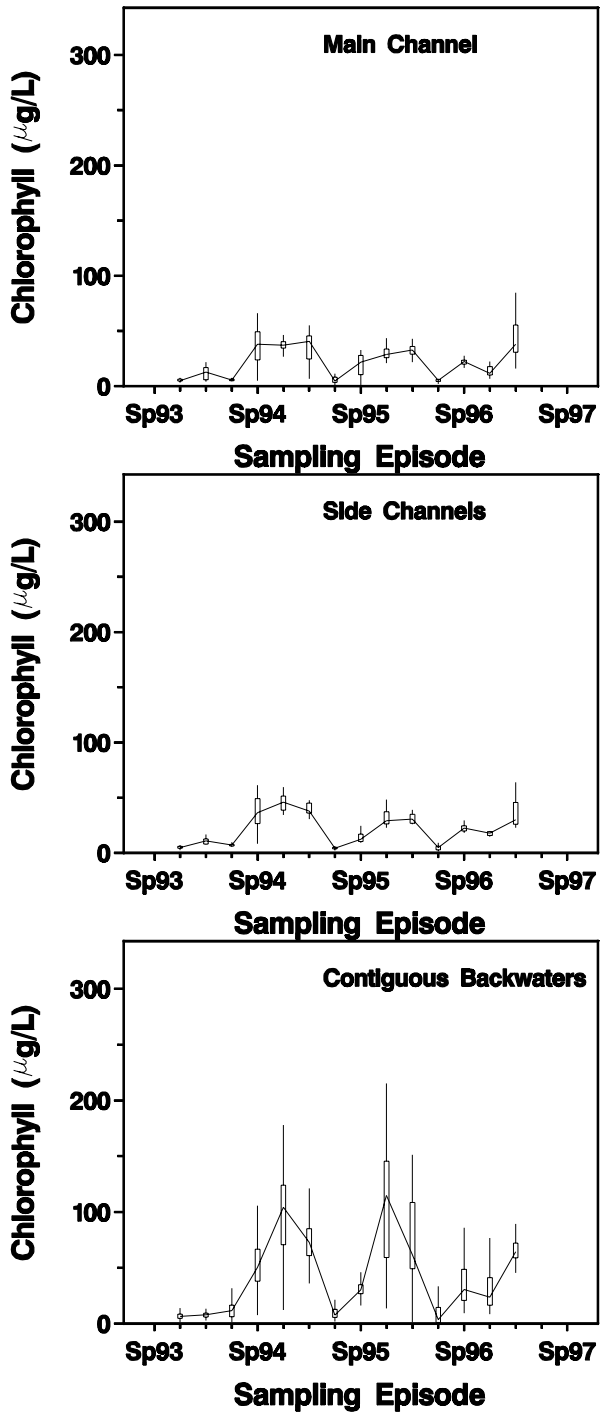


**Figure F-13.** Fluorometric chlorophyll *a* (µg/L) in stratified random sampling episodes from spring 1993 (Sp93) through fall 1996. Each sampling stratum is plotted separately. A solid line connects the medians of each episode, the 90th and 10th percentiles of the data are shown by the upper and lower extent of the box, and vertical lines extend to the maximum and minimum values (or to the limits of the plotting axis).

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The Long Term Resource Monitoring Program (LTRMP) for the Upper Mississippi River System was authorized under the Water Resources Development Act of 1986 as an element of the Environmental Management Program. The mission of the LTRMP is to provide river managers with information for maintaining the Upper Mississippi River System as a sustainable large river ecosystem given its multiple-use character. The LTRMP is a cooperative effort by the U.S. Geological Survey, the U.S. Army Corps of Engineers, and the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin.